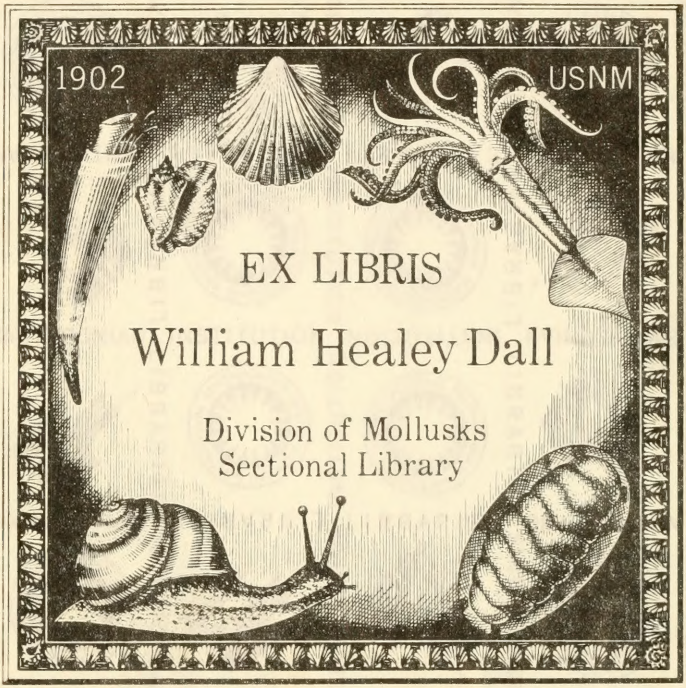

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AMERICAN
JOURNAL OF CONCHOLOGY.

VOLUME I.

EDITED BY

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Member of the Academy of Natural Sciences of Philadelphia; Corresponding Member of the
Boston Society of Natural History, the New York Lyceum of Natural History,
the California Academy of Natural Sciences, &c.

CONTAINING ARTICLES BY

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WESLEY NEWCOMB, M. D.
A. O. CURRIER.

JOHN G. ANTHONY.
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PHILADELPHIA:
GEORGE W. TRYON, JR., 625 MARKET STREET.
NEW YORK:
BAILLIERE BROTHERS, No. 520 Broadway.
BOSTON:
LITTLE, BROWN & Co.
LONDON:
TRUBNER & Co., No. 60 Paternoster Row.
PARIS:
J. B. BAILLIERE ET FILS, Rue Hautefeuille.
MADRID:
C. BAILLY-BAILLIERE, Calle del Principe.
BERLIN:
ASHER & Co., No. 20 Unter d. Linden.
1865.

Part 1 published February 25th, 1865.

“ 2 “ April 15th, “

“ 3 “ July 1st, “

‘ 4 “ October 1st, “

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Journal de Conchyliologie.

Monatsberichte der Konigln. Preuss. Akad. der Wissenchaften zu Berlin.—Fossilen Mollusken des Tertiær-Beckens von Wien.—Fauna der Land und Susswasser Mollusken Siebenburgens, by E A. Bielz.--Verhandlungen der K.-K. Zool.-Botanischen Gesellschaft in Wien.

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AMERICAN

JOURNAL OF CONCHOLOGY.

VOL. I. FEBRUARY 15, 1865. No. 1.

CATALOGUE OF THE EOCENE AND OLIGOCENE TESTACEA OF THE UNITED STATES.

BY T. A. CONRAD.

THE fossil shells in the following catalogue characterise two consecutive Tertiary formations, the oldest of which has long been regarded as an equivalent of the European Eocene. The later formation I believe to be of the same age as the Oligocene which immediately succeeds the Eocene. The fossils of the latter formation indicate two very distinct periods or stages which hold in common only two species so far as our present collections indicate. The older Eocene species may be known by the localities cited; Maryland, Virginia and New Jersey. Those of Claiborne, Alabama, are all upper Eocene exclusively, except *Venericardia planicosta, V. densata, Cyclas Claibornensis* and *Turritella Mortoni*. The Texan species are probably upper Eocene. A few other species are indicated in the catalogue as occurring only in the older division of that formation.

No species has been determined to be common to the Eocene and Oligocene. The latter is indicated by the locality of Vicksburg.

WORKS REFERRED TO.

Amer. J. Science—The American Journal of Science and Arts.

Amer. Philos. Soc.—Transactions of the American Philosophical Society.

Cont. to Geol.—Contributions to Geology by Isaac Lea.

Foss. Shells of Tert.—Fossil shells of the Tertiary Formations of the United States, by T. A. Conrad.

Geol. Trans.—Transactions of the Geological Society of Pennsylvania.

J. A. N. S.—Journal of the Academy of Natural Sciences of Philadelphia.

Proceed. A. N. S.—Proceedings of the Academy of Natural Sciences of Philadelphia.

Proceed. Nat. Instit.—Proceedings of the National Institution.

LOCALITIES.

Claib.—Claiborne, Clarke County, Alabama.
Enterprize.—Clarke County, Mississippi.
Jackson.—Hinds County, Mississippi.
St. Stephens.—Washington County, Alabama.
Texas.—Wheelock, Robertson County, Texas.
Vicks.—Vicksburg, Warren County, Mississippi.

CONCHIFERA.

PHOLADIDÆ.

PHOLAS, Lin.

P. PETROSA, C.—Proceed. Nat. Instit., p. 193, ~~t.~~ pl. 2, f. 4. A. J. Science, i., 2d series, p. 213, t. 2, f. 1. Piscataway, Md.

PHOLAMERIA, Conrad.

P. TRIQUETRA (*Pholas,*) C.—J. A. N. Sciences, i., 2d series, p. 127, t. 13, f. 3. Vicks.

TEREDO, Lin.

T. SIMPLEX, Lea.—Cont. to Geol., p. 38, t. 1, f. 6. Claib.

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GASTROCHÆNA, Spengler.

G. LARVA (*Fistulana,*) C.—A. J. Science, i., 2d series, p. 212, t. 1, f. 5. Claib.

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GLYCIMERIS, Klein.

G. ELONGATA (*Panopæa,*) C.—Trans. Geol. Soc. Penns., i., p. 339, t. 13, f. 1. A. J. Science, i., 2d series, p. 215, t. 13, f. 1. Piscataway, Md.

G. OBLONGATA (*Panop.*) C.—J. A. N. Sciences, i., 2d series, p. 121, t. 13, f. 12. Vicks.

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CORBULA, Brug.

C. ALTA, C.—J. A. N. Sciences, i., 2d series, p. 124, t. 12, f. 33 35. Vicks.
C. BICARINATA, C.—Wailes' Ag. and Geol., of Miss., t. 14, f. 3. Jackson, Miss.
C. DENSATA, C.—*Ibid.*, f. 9.—*Ibid.*
C. FILOSA, C.—Amer. Jour. Conch.,* 1865.
C. ENGONATA, C.—J. A. N. Sciences, i., 2d series, p. 124, t. 12, f. 30. Vicks.
C. INTASTRIATA, C.—J. A. N Sciences, i., 2d series, p. 124, t. 12 f. 31.—*Ibid.*
C. LAQUEATA, C.—Amer. Jour. Conch., 1865.—Vicks.
C. NASUTA, C.—Foss. Shells of Tert., p. 38.—Claib.
C. Alabamiensis, Lea.—Cont. to Geol., p. 45, t. 1, f. 12.
C. ONISCUS, C.—A. J. Science, xxiii., p. 341. Claib.
C. Murchinsonii, C. gibbosa, Lea.—Cont. to Geol., p. 45, t. 1. f. 13, 14. 6/
C. TEXANA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 384, t. 67, f. 54. Texas.

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P. MARYLANDICA, C.—Proceed. Nat. Instit., p. 193, t. 1, f. 3. A. J. Science, i., 2d series, p. 214, t. 1, f. 9. U. Marlboro', Maryland.

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MACTRA, Lin.

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M. dentata? Lea.—Cont. to Geol., p. 41, t. 1, f. 9.
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G. LINTEA (*Psammobia*,) C.—J. A. N. Sciences, i., 2d series, p. 122, t. 12, f. 25. Vicks.

G. PAPYRIA (*Psammobia*,) C.—J. A. N. Sciences, i., 2d series, p. 121, t. 12, f. 15, 17. Vicks.

G. MISSISSIPPIENSIS (*Psammobia*.)—*Ibid.*—p. 122. t. 12, f. 26. Vicks.

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D? ALTA (*Dosinia,*) C.—Ex. and Surveys, Railroad Route to Pac. v., p. 320, t. 2, f. 2. California.

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C. MISSISSIPPIENSIS (*Cytherea,*) C.—J. A. N. Science, 2d series, p. 123, t. 13, f. 16. Vicks.

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D. IMITABILIS (*Cytherea,*) C.—J. A. N. Sciences, i., 2d series, p. 123, t. 13, f. 14. Vicks.

D. LENIS (*Cytherea,*) C.—J. A. N. Sciences, i., 2d series, p. 130, t. 14, f. 19. Virginia.

D. LICIATA (*Cytherea,*) C.—J. A. N. Sciences, i., 2d series, p. 139, t. 14, f. 20. Virginia.

D. MORTONI (*Cytherea,*) C.—J. A. N. Sciences, vii., 150.

D. NUTTALII (*Cytherea,*) C.—J. A. N. Sciences, vii., p. 149. Claib.

D. OVATA (*Cytherea,*) Rogers.—Trans. A. P. Society, v., p. 340, vi., t. 27, f. 2. Virginia.

D. PERBREVIS (*Cytherea,*) C.—J. A. N. Sciences, 2d series 1, p. 23, t. 13, f. 18. Virginia.

D. PEROVATA (*Cytherea,*) C.—Foss. Shells of Tert., p. 37. Claib.
C. comis, Lea.—Cont. to Geol., p. 66, t. 2, f. 41.

D. POULSONI (*Cytherea,*) C.—Foss. Shells of Tert., p. 36. Claib.
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D. PYGA (*Cytherea,*) C.—J. A. N. Sciences, i., 2d series, p. 131, t. 14, f. 18. Virginia.

D. SOBRINA (*Cytherea,*) C.—J. A. N. Sciences, i., 2d series, p. 123, t. 13, f. 17. Vicks.

D. SUBCRASSA (*Cytherea,*) Lea.—Cont. to Geol., p. 67, t. 2, f. 43. Claib.

D. SUBIMPRESSA (*Cytherea,*) C.—J. A. N. Sciences, i., 2d series. p. 130, t. 14, f. 26. Vicks.

D. UVASANA (*Meretrix,*) C.—Ex. and Surveys; Railroad Route to Pac. v., p. 320, t. 2, f. 3. California.

CYTHERIOPSIS, Conrad.

C. HYDANA (*Cytherea,*) C.—Foss. Shells of Tert., p. 36.
Gratelupia Moulinsii, Lea.—Cont. to Geol., p. 59, t. 2, f 33.

CARDIUM, Lin.

SUBGENUS, CERASTODERMA, Poli.

C. EVERSUM, C.—J. A. N. Sciences, i., 2d series, p. 122, t. 12, f. 18. Vicks.

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SUBGENUS, TRACHYCARDIUM, Morch.

C. GLOBOSUM, C.—J. A. N. Sciences, i., 2d series, p. 122.

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P. GAMBRINA, Gabb.—Proceed. A. N. Sciences, 1861, p. 371. Texas.

P. DIVERSA (*Cardium,*) C.—J. A. N. Sciences, 2d series, p. 122, t. 13, f. 8. Vicks.
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P. NICOLETI (*Cardium,*) C.—J. A. N. Sciences, viii., p. 190. Louisiana.

LÆVICARDIUM, Swains.

L. LINTEUM (*Cardium,*) C.—Ex. and Surveys; Railroad Route to Pac. v., p. 320, t. 2, f. 1. California.

CHAMIDÆ.

CHAMA, Lin.

C. MISSISSIPIENSIS, C.—J. A. N. Sciences, i., 2d series, p. 124, t. 13, f. 21, 27. Vicks.

VENERICARDIA, Lam.

V. ALTICOSTATA (*Cardita,*) C.—A. J. Science xxiii., p. 342, Jan. 1833. Claib.
V. transversa, Lea.—Cont. to Geol. p. 68, t. 2, f. 46, 1834.

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V? BILINEATA (*Cardita,*) C.—J. A. N. Sciences, i., 2d series, p. 128, t. 14, f. 9. South Carolina.

V. BLANDINGI, C.—J. A. N. Sciences, vi., p. 229, t. 9, f. 20. South Carolina.

V. DENSATA (*Cardita,*) C.—J. A. N. Sciences, 2d series p. 130, t. 14, f. 24. Claib.

V. MONILICOSTA (*Cardita,*) Gabb.—Proceed. A. N. Sciences, 1861, p. 371. Texas.

V. PARVA, Lea.—Cont. to Geol., p. 70, t. 2, f. 49.

V. PERANTIQUA, C.

Cardita subquadrata, Gabb.—J. A. N. Sciences, iv., 2d series, p. 303, t. 48, f. 22.—Monmouth County, N. J.

V. PLANICOSTA, Lam., C.—Foss. Shells of Tert., p. 20, t. 5, f. 2. *var.* regia, *Conrad.* Piscataway, Md.

V. ROTUNDA, Lea.—Cont. to Geol., p. 70, t. 2, f. 48.

V. SILLIMANI, Lea.—Ibid., 47.

A. SUBQUADRATA (*Cardita,*) C.—J. A. N. Sciences, i., 2d series, p. 128, t. 14, f. 9. South Carolina.

LUCINIDÆ.

CYCLAS, Klein.

Lucina, *Brug.*

C. ALVEATA, (*Lucina,*) C.—Foss. Shells. of Tert. p. 40, Nov. 1, 1833. A. J. Science, i., 2d series, p. 402, t. 4, f. 12. Claib.

L. lunata, Lea.—Cont. to Geol., p. 58, t. 1, f. 32. 1834. Claib.

C. CARINIFERA (*Lucina,*) C.—Ibid., p. 40. A. J. Science, i., 2d series, p. 402, t. 4, f. 15. Claib.

C. cornuta (*Lucina*), Lea.—Cont. to Geol., p. 56, t. 1, f. 29. Claib.

C. CLAIBORNENSIS, C.—Amer. Jour. Conch. 1865.

C. CURTA, C.—Amer. Jour. Conch. 1865. Enterprise.

L. DOLABRA (*Lucina,*) C.—Ibid., p. 40. Claib.

Astarte recurva, Lea.—Cont. to Geol. p. 61, t. 2, f. 34.

C. MODESTA (*Lucina,*) C.—A. J. Science, i., 2d series, p. 403, t. 4, f. 13. Claib.

C. MISSISSIPPIENSIS (*Lucina,*) C.—J. A. N. Science, i., 2d series, p. 124, t. 12, f. 22. Vicks.

C. PAPYRACEA (*Lucina,*) Lea.—Cont. to Geol. p. 58, t. 1, f. 31, Claib.

C. PANDATA (*Lucina,*) C.—Foss. Shells of Tert., p. 40, Claib.

L. compressa, Lea.—Cont. to Geol., p. 55, t. 1, f. 27.

C. PERLEVIS, (*Lucina,*) C.—J. A. N. Science, i., 2d series, p. 124. Vicks

C. POMILIA (*Lucina,*) C.—Foss. Shells of Tert., p. 40. A. J. Science, i., 2d series, p. 402, t. 4, f. 17. Claib.

C. IMPRESSA (*Lucina,*) Lea.—Cont. to Geol., p. 57, t. 1, f. 30.

C. SUBVEXA (*Lucina,*) C.—Ibid., p. 40. A. J. Science, i., 2d series, p. 403, t. 4, f. 14. Claib.

C. SYMMETRICA (*Lucina,*) C.—Foss. Shells of Tert., p. 40. Claib.
L. rotunda, Lea.—Cont. to Geol., p. 56, t. 1, f. 28.

GAFRARIUM, Bolten.

G. DISTANS (*Corbis,*) C.—Foss. Shells of Tert., p. 41. A. J. Science, i., 2d series, p. 401, t. 4, f. 11. Claib.
C. undata (*Young.*)—Foss. Shells of Tert.—Ibid., p. 41.
G. LIRATUM (*Corbis,*) C.—A. J. Science, i., 2d series, p. 401, t. 4, f. 16. A. J. Science, i., 2d series, p. 401, t. 4, f. 16. Claib.
Corbis lamellosa, Conrad, not Lam.

SCINTILLA, Deshayes.

S. OBLONGA (*Kellia,*) C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 28. Vicks.

MYSIA, Leach.

M. ASTARTÆFORMIS, C.—J. A. N. Sciences, iv., 2d series, p. 296. Claib.
M. DELTOIDEA, C.—J. A. N. Sciences, iv., 2d series, p. 296.
M. EBURNEA (*Loripes,*) C.—J. A. N. Sciences, i., 2d series, p. 124, t. 12, f. 23. Vicks.
M. NITENS (*Egeria,*) Lea.—Cont. to Geol., p. 51, t. 1, f. 19. Claib.
M. UNGULINA, C.—Morton's Org. Rem. Appendix, p. 7. Claib.
Astarte ungulina, C.—A. J. Science, xxiii., p. 342. 1833.
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SPHÆRELLA, Conrad.

S. INFLATA (*Egeria,*) Lea.—Cont. to Geol., p. 50, t. 1, f. 18. Claib.
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S. TURGIDA (*Loripes,*) C.—J. A. N. Sciences, 2d series, p. 124, t. 12, f. 23. Vicks.

CRASSATELLIDÆ.

ASTARTE, Sow.

A. PARILIS, C.—Wailes' Ag. and Geol. of Miss., t. 14, f. 2. Jackson, Miss.
A. PARVA, Lea.—Cont. to Geol., p. 63, t. 2, f. 37. Claib.
A. minor, Lea.—*Ibid.*, f. 38. *Ibid.*
A. TELLINOIDES, C.—A. J. Science, xxiii., p. 342. Claib.
A. Nicklinii, *A. sulcata*, Lea.—Cont. to Geol., p. 61, t. 2, f. 35, 36. Claib.

PTEROMERIS, Conrad.

P. MINUTISSIMA (*Astarte,*) Lea.—Cont. to Geol., p. 64, t. 2, f. 39. Claib.

GOULDIA.

G. PERDITA, C.—Amer. Jour. Conch., 1865. Enterprise, Miss.

ALVEINUS, Conrad.

A. PARVA, C.—Amer. Jour. Conch., 1865. Enterprise, Miss.

CRASSATELLA, Lam.

C. ALÆFORMIS, C.—J. A. N. Sciences, vi., p. 228, t. 10, f. 1. A. J. Science, p. 396, t. 3, f. 3. Maryland.

C. ALTA, C.—Foss. Shells of Tert., p. 31, t. 7. A. J. Science, i., 2d series, p. 395, t. 3, f. 1. Claib.

C. ANTESTRIATA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 388, t. 67, f. 53. Texas.

C. CAPRI-CRANIUM, Rogers.—Trans. Amer. Philos. Soc. vi., p. 375, t. 30, f. 2. Virginia.

C. FLEXURA, C.—Wailes' Ag. and Geol. of Miss., t. 14, f. 7.

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C. PRODUCTA, C.—Proceed. A. N. Sciences, 1862, p. 289. Enterprise, Miss.

C. PROTEXTA, C.—Foss. Shells of Tert., p. 22, t. 8, f. 2. A. J. Science, i., 2d series, p. 395, t. 3, f. 2. Claib.

C. PALMULA, C.—A. J. Science, i., 2d series, p. 396, t. 4, f. 1. Maryland.

C. RHOMBOIDEA, C.—A. J. Science, i. 2d series, p. 396, t. 3, f. 5. South Carolina.

C. UVASANA, C.—Ex. and Surveys; Railroad Route to Pac., v., p. 320, t. 2, f. 5. California.

MYTILIDÆ.

MYTILUS, Linn.

M? HUMERUS, C.—Ex. and Surveys; Railroad Route to Pac. v., p. 321, t. 2, f. 10. California.

PERNA, Adanson.

P. CRETACEA (*Modiola,*) C.—Trans. Geol. Soc. Philadelphia, p. 340, t. 13, f. 2. Clarke County, Alabama.

P. MISSISSIPPIENSIS (*Modiola,*) C.—J. A. N. Sciences, i., 2d series, p. 126, t. 12, f. 19. Vicks.

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A. FILOSA, C.—Amer. Jour. Conch., 1865. Enterprise, Miss.

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Myoparo, Lea, 1834.

S. MARGARITACEUM, C.—Foss. Shells of Tert., p. 39. Claib. *Myoparo costatus,* Lea.—Cont. to Geol., p. 74, t. 2, f. 51, 1834.

CRENELLA, Brown.

C? LATIFRONS, C.—J. A. N. Sciences, iv., 2d series, p. 296. Alabama.

LITHOPHAGINÆ.

LITHOPHAGA, Bolten.

L. CLAIBORNENSIS (*Lithodomus,*) C.—J. A. N. Sciences, i., 2d series, p. 132, t. 14, f. 27. Claib.

AVICULIDÆ.

AVICULA, Klein.

A. ARGENTEA, C.—J. A. N. Sciences, i., 2d series, p. 126, t. 12. f. 10. Vicks.

A. LIMULA, C.—Foss. Shells of Tert., p. 39. Claib.
A. Claibornensis, Lea.—Cont. to Geol., p. 86, t. 3, f. 65.

PINNA, Lin.

P. ARGENTEA, C.—J. A. N. Sciences, i., 2d series, p. 126, t. 12. f. 10. Vicks.

TRIGONIIDÆ.

HIPPAGUS, Lea.—1834.

H. ISOCARDIOIDES, Lea.—Cont. to Geol., p. 72, t. 2, f. 50.

ARCINÆ.

ARCA, Lin.

A. PROTRACTA (*Byssoarca,*) C.—J. A. N. Sciences, i., 2d series, p. 126, t. 13, f. 26. Vicks.

ANOMALOCARDIA, Klein.

A. MISSISSIPPIENSIS (*Arca,*) C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 11, 15. Vicks.

A. RHOMBOIDELLA (*Arca,*) Lea.—Cont. to Geol., p. 74, t. 2, f. 52.

CUCULLÆARCA, Conrad.

C. LIMA (*Byssoarca,*) C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 23. Vicks.

C. CUCULLOIDES (*Arca,*) C.—Foss. Shells of Tert., p. 37.

C. MISSISSIPPIENSIS (*Byssoarca,*) —J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 32. Vicks.

LATIARCA, Conrad, 1862.

L. GIGANTEA (*Cucullæa,*) C.—J. A. N.Sciences, vi., p. 227, t. 10, f. 4. Maryland.

L. ONONCHELA (*Cucullæa,*) Rogers.—Trans. Amer. Philos. Soc., vi., p. 372, t. 28, f. 2. Virginia.

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AXINÆINÆ.

AXINÆA, Poli.

A. ARCTATUS (*Pectunc,*) C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 24. Vicks.

A. BELLASCULPTA, C.—J. A. N. Sciences, iv., 2d series, p. 295.

A. IDONEA (*Pectunc,*) C.—Foss. Shells of Tert., p. 39. Claib.

A. INTERCOSTATA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 402, t. 68, f. 2. Texas.

A. MISSISSIPPIENSIS (*Pectunc,*) C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 25. Vicks.

A. STAMINA (*Pectunc,*) C.—A. J. Science, xxiii., p. 342. 1833. Claib.

Pectunc. Broderipii, Lea.—Cont. to Geol., p. 76, t. 3, f. 53.

A. TRIGONELLA (*Pectunc,*) C.—A. J. Science, xxiii., p. 342.

Pectunculus deltoideus, Lea.—Cont. to Geol., p. 77, t. 3, f. 55.

LIMOPSIS, Sarsi.

L. AVICULOIDES (*Pectunc.*) C.—Foss. Shells of Tert., p. 39. J. A. N. Sciences, iv., 2d series, p. 297, t. 47, f. 12.

Pectunculus obliquus, Lea.—Cont. to Geol., p. 78, t. 3, f. 57.

L. CORBULOIDES, (*Pectunc.*) C.—Foss. Shells of Tert., p. 40. J. A. N. Sciences, p. 297.

L. DECISUS, (*Pectunc.*) C.—*Ibid.,* p. 47, t. 13.

Noetia pulchra? Gabb.—J. A. N. Sciences, iv. 2d series, p. 388, t. 67, f. 55.

L. DECLIVIS (*Pectunc.*) C.—Foss. Shells of Tert., p. 16.

Pectunc. minor, Lea.—Cont. to Geol. p. 77, t. 3, f. 54.

L. ELLIPSIS (*Pectunc.*) Lea.—Cont. to Geol., p. 78, t. 3, f. 56. C.—J. A. N. Sciences, iv., 2d series, p. 297, t. 47, f. 9. Claib.

L. PECTUNCULARIS (*Nucula,*) Lea.—*Ibid.,* p. 81, t. 3, f. 60. Claib.

L. PERPLANUS (*Pectunculus,*) C.—Foss. Shells of Tert., p. 40. J. A. N. Sciences, iv., p. 297, t. 47, f. 16. Claib.

TRIGONOCÆLIX.

T. CUNEUS (*Limopsis,*) C.—J. A. N. Sciences, iv., 2d series, p. 297, t. 46, f. 17. Claib.

NUCULIDÆ.

NUCULA, Lam.

N. CARINIFERA, Lea.—Cont. to Geol., p. 198, t. 6, f. 212. Claib.

N. MAGNIFICA, C.—Foss. Shells of Tert., p. 37. Claib

N. Sedgewickei, Lea.—Cont. to Geol., p. 79, t. 3, f. 58.

N. VICKSBURGENSIS, C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 29. Vicks.

YOLDIA, Moll.

Y. EBOREA (*Leda,*) C.—J. A. N. Sciences, iv., 2d series, p. 295, t. 47, f. 26. Alab.

NUCULANA, Link.

N. ÆQUALIS (*Nucula,*) C.

N. media, Lea.—Cont. to Geol.

N. BELLA (*Nucula,*) C.—A. J. Science, xxiii., p. 343. Claib.

N. CÆLATA (*Nucula,*) C.—A. J. Science, xxiii., p. 343. Claib.

N. Brongniartii, Lea.—Cont. to Geol.

N. CALCARENSIS (*Nucula,*) C.—J. A. N. Sciences, i., 2d series, p. 128, t. 14, f. 5. South Carolina.

N. CLAIBORNENSIS, (*Nucula,*) C.—J. A. N. Sciences, i., 2d series, p. 131, t. 14, f. 22.

N. CAROLINENSIS (*Nucula,*) C.—*Ibid.*, p. 128, t. 14, f. 3.

N. COMPSA (*Leda,*) Gabb.—J. A. N. Sciences, iv., 2d series, p. 387, t. 57. Texas.

N. CULTELLIFORMIS (*Nucula,*) Rogers.—Trans. A. P. Soc., v., p. 399. Virginia.

N. EQUALIS (*Nucula,*) C.—Foss. Shells of Tert., p. 46.

N. IMPROCERA (*Nucula,*) C.—J. A. N. Sciences, i., 2d series, p. 131, t. 14, f. 23. Virginia.

N. MAGNA, (*Nucula,*) Lea.—Cont to Geol., p. 197, t. 6, f. 121.

N. MEDIA (*Nucula,*) Lea.—Cont. to Geol., p. 83, t. 3, f. 62. Claib.

N. MUCRONATA (*Nucula,*) C.—J. A. N. Sciences, i., 2d series, p. 128, t. 14, f. 2. Vicks.

N. OPULENTA (*Nucula,*) C.—Foss. Shells of Tert., p. 46. Claib.

N. OVULA (*Nucula,*) Lea.—Cont. to Geol., p. 80, t. 3, f. 59.

N. PARILIS (*Nucula,*) C.—J. A. N. Sciences, i., 2d series, p. 132, t. 14, f. 31.

N. PARVA (*Nucula,*) Rogers.—Trans. Amer. Philos. Soc., v., p. 340.

N. PLANA (*Nucula,*) Lea.—Cont. to Geol., p. 199, t. 6, f. 213. Claib.

N. PLICATA (*Nucula,*) Lea.—Cont. to Geol., p. 85, t. 3, f. 64 Claib.

N. PROTEXTA, Amer. Jour. Conch., 1865.

N. PULCHERRIMA (*Nucula,*) Lea.—Cont. to Geol., p. 84, t. 3, f. 63. Claib.

N. SEMEN (*Nucula,*) Lea.—Cont. to Geol., p. 200, t. 6, f. 214. Claib.

N. SERICA, C.—J. A. N. Sciences, i., 2d series, p. 125, t. 13, f. 29. Vicks.

N. SUBTRIGONA (*Nucula,*) C.—J. A. N. Sciences, i., 2d series, p. 128, t. 14, f. 4. South Carolina.

PECTINIDÆ.

PECTEN, Lin.

P. ANATIPES, Morton.—Org. Rem. Cret. Group, p. 58, t. 5, f. 4. St. Stephens, Alabama.

P. CALVATUS, Morton.—Org. Rem. Cret. Group, p. 58. t. 10, f. 3. South Carolina.

P. DESHAYSII, Lea.—Cont to Geol., p. 87, t. 3, f. 66. Claib.
P. Lyelli, Lea.—*Ibid.*, p. 88, t. 3, f. 67.—*Ibid.*

P. HOLBROOKII, Ravenel.—Proceed. A. N. Sciences, ii., p. 96, South Carolina.

P. MEMBRANOSUS, Morton.—Org. Rem. Cret. Group, p. 59, t. 10, f. 4. South Carolina.

P. NUPERUS, C.—Proceed. A. N. Sciences, vii., p. 259. Wailes' Geol. Miss., pl., xiv. f. 11. Jackson.

P. PERPLANUS, Morton.—Org. Rem. Cret. Group, p. 58, t. 14, f. 8. St. Stephens.

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P. SPILLMANI, Gabb.—J. A. N. Science, iv., p. 402, t. 68, f. 3. Alab.

AMUSSIUM, Klein.

A. MORTONI (*Pecten,*) Ravenel.—Proceed. A. N. Science,s ii., p. 96. South Carolina.

RADULA, Klein.

R. STAMINEA (*Lima,*) C.—J. A. N. Science, i., 2d series, p. 126, t. 13, f. 30. Vicks.

SPONDYLIDÆ.

SPONDYLUS, Lin.

S. DUMOSUS (*Plagiostoma,*) Morton.—Org. Rem. Cret. Group, p. 59, t. 16, f. 8. Clarke County, Alabama.

PLICATULA, Lam.

P. FILAMENTOSA, C.—Foss. Shells of Tert., p. 38. Claib.
P. Mantelli, Lea.—Cont. to Geol., p. 89, t. 3, f. 68.

ANOMIIDÆ.

ANOMIA, Lin.

A. JUGOSA, C.—Proceed. A. N. Sciences, i., p. 310. iii., t. 1, f. 15. South Carolina.

A. RUFFINI, C.—Proceed. A. N. Sciences.

OSTREA, Lin.

O. ALABAMIENSIS, Lea.—Cont. to Geol., p. 91, t. 3, f. 71. Claib.

O. princerna, (young.)—*Ibid.*, f. 73.
O. lingua-canis.—*Ibid.*, f. 72.

O. CAROLINENSIS, C.—Foss. Shells of Tert., p. 27, t. 14, f. 1. South Carolina.

O. COMPRESSIROSTRA, Say.—J. A. N. Sciences, iv., p. 132, t. 8, f. 2. U. Marlboro,' Md.
O. Bellovacina, C. not Lam.—Proceed. N. Instit., p. 172.

O. GEORGIANA, C.—J. A. N. Sciences, vii., p. 156. Savannah River, Georgia.

O. SINUOSA, Rogers.—Trans. Amer. Philos. Soc., v., p. 340. vi., p. 27, t. 1. Virginia.

O. STELLÆFORMIS, C.—Foss. Shells of Tert., p. 27, t. 13, f. 2. Claib.
O. divaricata, Lea.—Cont. to Geol., p. 91, t. 3, f. 70.
O. radians, Conrad.—Foss. Shells of Tert., p. 27, t. 13, f. 1.
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SUBGENUS, GRYPHŒOSTREA, Conrad.

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ANOMIA, Lin.

A. EPHIPPIOIDES, Gabb.—J .A. N. Sciences, iv., 2d series, p. 388, t. 67, f. 59. Texas.

BRACHIOPODA.

TEREBRATULIDÆ.

TEREBRATULINA, D'Orbigny.

T. GRACILIS, Schloth.—Die Petrifactenkunde, p. 270, No. 35. Alabama.

T. LACHRYMA (*Terebratula,*) Morton.—Org. Rem. Cret. Group, p. 72, t. 10, f. 11 and 16, 6. Near Claib. Alabama, South Carolina.

TEREBRATULA, Llhyd.

T. CANIPES, Ravenel.—Proceed. A. N. Sciences, ii., p. 97. S. Carolina.

CEPHALOPODA.

ATURIA, Bronn.

A. ALABAMENSIS (*Nautilus,*) Morton.—Org. Rem. Cret. Group, p. 33, t. 18, f. 3. Clarke County, Alabama.

A. VANUXEMI (*Pelagus,*) C.—J. A. N. Sciences, i., 2d series, p. 130, t. 14, f. 15. N. J.

BELOSEPIA, Voltz.

B. UNGULA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 376, t. 67, f. 1, 2, 3, 4. Wheelock.

GASTEROPODA.

MURICIDÆ.

MUREX, Lin.

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F? LINEATA (*Mitra.*,) Lea.—Cont. to Geol., p. 168, t. 5, f. 174. Claib.

F? MINIMA (*Mitra.*,) Lea.—*Ibid.*, t. 6, f. 175. Claib.

F? PEREXILIS (*Mitra.*,) C.—Foss. Shells of Tert., p. 46. 2d edition, p. 42, t. 16, f. 7. Claib.

CONOMITRA, Conrad.

C. FUSOIDES (*Mitra.*,) Lea.—Cont. to Geol., p. 169, t. 6, f. 176. C.—Foss. Shells of Tert., p. 42, t. 16, f. 8. Claib.

C. STAMINEA (*Mitra.*,) C.—J. A. N. Sciences, i. 2d series, p. 120, t. 12, f. 4. Vicks.

C. VICKSBURGENSIS (*Mitra.*,) C.—*Ibid.*, p. 120.

MARGINELLIDÆ.

ERATO, Risso.

E. CRASSILABRA (*Marginella,*) C.—Foss. Shells of Tert., 33, 2d edition, p. 45, t. 16, f. 13. Claib.

M. anatina, Lea.—Cont. to Geol., p. 176, t. 6, f. 186.

E? CONSTRICTA (*Marginella,*) C.—Foss. Shells of Tert., p. 46, t. 16, f. 15. Claib.

E. HUMEROSA (*Marginella,*) C.—Foss. Shells of Tert., p. 45, t. 16, f. 14. Claib.

Marg. crassilabra, Lea.—Cont. to Geol., t. 6, f. 188.

VOLUTELLA, Swains.

V. LARVATA (*Marginella,*)C.—Foss. Shells of Tert., p. 33, 2d edition, p. 45, t. 16, f. 12. Claib.

Marginella ovata, Lea.—Cont. to Geol., p. 179, t. 6, f. 191.

Marginella semen, Lea.—*Ibid.*, f. 190.

CASSIDIDÆ.

SEMICASSIS, Klein.

S. BREVICOSTATA (*Cassis,*) C.—J. A. N. Sciences, vii., p. 146. Claib.

S. CÆLATURA (*Cassis,*) C.—*Ibid.*, i., 2d series, p. 119, t. 11, f. 44. Vicks.

S. MISSISSIPPIENSIS (*Cassis,*)C.—*Ibid.*, p. 118, t. 17, f. 43. Vicks.

S. NUPERA (*Cassis,*) C.—Foss. Shells of Tert., p. 46. Claib.

S? SOWERBII (*Buccinum,*) Lea.—Cont. to Geol., p. 164, t. 5, f. 169. Claib.

S. TAITII (*Cassis,*) C.—J. A. N. Sciences, vii., p. 145. Claib.

GALEODIA, Link.

G. LINTEA (*Cassidaria,*) C.—J. A. N. Sciences, i., 2d series, p. 118, t. 11, f. 43. Vicks.

G. TRICARINATA (*Cassis,*) C.—J. A. N. Sciences, i., 2d series, iv., p. 293. Vicks.

SUBGENUS, GALEODARIA, Conrad.

G. PETERSONI, C.—Proceed. A. N. Sciences, vii., p. 262.—Wailes' Geol., Miss., pl. xviii., f. 9.

MORUM, Bolten.

M. HARPULA (*Oniscia,*) C.—J. A. N. Sciences, i., 2d series, p. 119, t. 12, f. 6. Vicks.

DOLIOPSIS, Conrad.

D. TRICARINATUM, C.—Amer. Journ. Conch., 1865.

SYCOTYPUS, Browne.

S. PENITUS (*Pyrula,*) C.—Foss. Shells of Tert., p. 32. Claib
P. tricarinata, C., (not Lam.)—2d edition, p. 38, t. 15, f. 6.
P. cancellata, Lea.—Cont. to Geol., p. 154, t. 5, f. 160.
P. elegantissima, Lea.—*Ibid.*, p. 155, t. 5, f. 161.

S. MISSISSIPPIENSIS (*Fusus,*) C.—J. A. N. Sciences, i., 2d series, p. 117. Vicks.

NATICIDÆ.

NATICA, Lam.

N. MAGNOUMBILICATA, Lea.—*Ibid.*, p. 109, t. 4, f. 94. Claib.

N. MINIMA, Lea.—Cont. to Geol., p. 107, t. 4, f. 91. Claib.

N. MINOR, Lea.—*Ibid.*, p. 107, t. 4, f. 90. Claib.

N. PERMUNDA, C.—Proceed. A. N. Sciences, vii., p. 260.—Wailes' Geol. Miss., t. 16, f. 2. Jackson.

LUNATIA, Gray.

L? ALVEATA (*Natica,*) C.—Ex. and Survey; Pac. Railroad, v., p. 321, t. 2, f. 8. California.

L. EMINULA (*Natica,*) C.—Foss. Shells of Tert., p. 46. Claib.
Natica parva, Lea.—Cont. to Geol., p. 106, t. 4, f. 89.

L. MARYLANDICA, C.—Nov. Spec.

L. MINIMA (*Natica,*) Lea.—Cont. to Geol., p. 107, t. 4, f. 91. Claib.

L. MOOREI, Gabb.—J. A. N. Sciences, iv., 2d series, p. 384, t. 67, f. 34. Texas.

L. SEMILUNATA (*Natica,*) Lea.—Cont. to Geol., p. 108, t. 4, f. 93. Claib.

NEVERITA, Risso.

N. ÆTITES (*Natica,*) C.—Foss. Shells of Tert., p. 46. Claib.
Natica mamma, Lea.—Cont. to Geol., p. 109, t. 4, f. 95.

N. ARATA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 384, t. 67, f. 35. Texas.

N. GIBBOSA (*Natica,*) Lea.—Cont. to Geol., p. 108, t. 4, f. 92. Claib.

N. LIMULA (*Natica,*) C.—Foss. Shells of Tert., p. 46. Claib.

AMPULLINOPSIS, Conrad.

A. MISSISSIPPIENSIS (*Natica,*) C.—J. A. N. Sciences, i., 2d series, p. 114, t. 11, f. 10. Vicks.

NATICINA, Gray.

N? MISSISSIPPIENSIS (*Natica,*) C.—J. A. N. Sciences, i., 2d series, p. 113, t. 11, f. 8. Vicks.

LUPIA, Conrad.

L. PEROVATA (*Ampullara,*) C.—Proceed. A. N. Sciences, iii., p. 21. Claib.

CATINUS, Klein.

C. ARCTATUS (*Sigaretus,*) C.—Foss. Shells of Tert., p. 45.

C. BILIX (*Sigaretus,*) C.—A. J. Science, xxiii., p. 344. Claib.

C. DECLIVIS (*Sigaretus,*) C.—Foss. Shells of Tert., p. 45.

C. MISSISSIPPIENSIS (*Sigaretus,*) C.—J. A. N. Sciences, i., 2d series, p. 113, t. 11, f. 9. Vicks.

SCALARIDÆ.

SCALA, Klein.

S. DORMITOR, C.—Nov. Spec.

S. LINTEA (*Scalaria,*) C.—J. A. N. Sciences, 2d series, p. 294. Claib.

S. QUINQUEFASCIATA (*Scalaria,*) Lea.—Cont. to Geol., p. 116. Claib.

S. PLANULATA (*Scalaria,*) Lea.—Cont. to Geol., p. 115, t. 4, f. 102. Claib.

SUBGENUS, SCALINA, Conrad.

S. STAMINEA (*Scalaria,*) C.—J. A. N. Sciences, iv., 2d series, p. 294. Claib.

S. TRIGINTINARIA (*Scalaria,*) C.—J. A. N. Sciences, i., 2d series, p. 114, t. 11, f. 14. Vicks.

SUBGENUS, OPALIA, Adams.

S. SESSILIS (*Scalaria,*) C.—Foss. Shells of Tert., p. 45. Claib.
Scalaria carinata, Lea.—Cont. to Geol., p. 116, t. 4, f. 103.

SUBGENUS, CIRSOSTREMA, Adams.

C. CLAIBORNENSIS, C.—Nov. Spec.

C? NASSULA (*Scalaria*,) C.—Foss, Shells of Tert., p. 31. Claib.

C. OCTOLINEATA (*Scalaria*,) C.—J. A. N. Sciences, vi., p. 294. Miss.

COMPSOPLEURA, Conrad.

C. TRINODOSA (*Chemnitzia*,) C.—J. A. N. Sciences, iv., 2d series, p. 288, t. 47, f. 33. Alabama.

TEREBRIDÆ.

TEREBRA, Adanson.

T. DIVISURA, C.—J. A. N. Sciences, i., 2d series, p. 114, t. 11· f. 13. Vicks.

T. TANTULA, C.—J. A. N. Sciences, i., 2d series, p. 114, t. 11, f. 15. Vicks.

T. VENUSTA, Lea.—Cont. to Geol., p. 167, t. 5, f. 173. Claib.

TEREBRIFUSUS, Conrad.

T. AMŒNA (*Buccinum*,) C.—Foss. Shells of Tert. p. 45. Claib.
Terebra gracilis, Lea.—Cont. to Geol., p. 166, t. 5, f. 171.
Buccinanops amœnum, D'Orbig.—Prodromus, ii., p. 369, t. 641.

PYRAMIMITRA, Conrad.

P. COSTATA (*Mitra*,) Lea.—Cont. to Geol., p. 166, t. 5, f. 172. Claib.

P. TEREBRIFORMIS (*Mitra*,) C.—J. A. N. Sciences, i., 2d series, p. 132, t. 14, f. 30. Claib.

OBELISCUS, Humph.

O. LARVATUS (*Pyramidella*,) C.—Foss. Shells of Tert., p. 46.
Actæon elevatus, Lea.—Cont. to Geol., p. 113, t. 4, f. 98.
A. pygmæus, Lea.—*Ibid.*, p. 114, t. 4, f. 101.

O. MELANELLUS (*Actæon*,) Lea.—Cont. to Geol., p. 113, t. 4, f. 99. Claib.

O. PEREXILIS, C.—Amer. Jour. Conch., 1865. Claib.

O. PYGMÆUS (*Actæon*,) Lea.—Cont. to Geol., p. 114, t. 4, f. 101. Claib.

O? STRIATUS (*Actæon*,) Lea.—Cont. to Geol., p. 114, t. 4, f. 100. Claib.

CÆLATURA, Conrad.

C. SULCATA (*Pasithea*,) Lea.—Cont. to Geol., p. 103, t. 4, f. 84. Claib.

C. STRIATA (*Pasithea*,) Lea.—*Ibid.*, p. 102, t. 4, f. 83. Claib.

EULIMA, Risso.

E. ACICULATA (*Pasithea*,) Lea.—Cont. to Geol., p. 102, t. 4, f. 82. Claib.

E. EXILIS, Gabb.—J. A. N. Sciences, 2d series, iv., p. 385, t. 67, f. 43. Texas.

E. LUGUBRIS (*Pasithea,*) Lea.—Cont. to Geol., p. 101, t. 4, f. 81. Claib.

E. NOTATA (*Pasithea,*) *Ibid.*, p. 101, t. 4, f. 80. Claib.

E. TENUA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 386, t. 67, f. 45. Texas.

E. TEXANA, Gabb.—*Ibid.*, p. 386, t. 67, f. 44. Texas.

E. SECALE (*Pasithea,*) Lea.—Cont. to Geol., p. 100, t. 4, f. 79, Claib.

SUBGENUS, PASITHEA.

E. CLAIBORNENSIS (*Pasithea,*) Lea.—Cont. to Geol., p. 104, t. 4, f. 87. Claib.

E. GUTTULA (*Pasithea,*) Lea.—*Ibid.*, p. 104, t. 4, f. 86. Claib.

NISO, Risso.

N. UMBILICATA (*Bonellia,*) C.—J. A. N. Sciences, viii., p. 188, Claib.

Pasithea umbilicata, Lea.—Cont. to Geol., p. 103, t. 4, f. 85, Claib.

Niso umbilicata, D'Orbig.—Prodromus, ii., p. 318, t. 92.

Bonellia lineata, C.—J. A. N. Sciences, viii., p. 188.

CERITHIOPSIDÆ.

CERITHIOPSIS, Forbes and Hanley.

C. BICOSTELLATUS (*Cerithium,*) C.—J. A. N. Sciences, 2d series, i., p. 129. South Carolina.

C. CLAIBORNENSIS (*Cerithium,*) C.—*Ibid.*, p. 132, t. 14, f. 32. Claib.

C. NASSULA (*Cerithium,*) C.—*Ibid.*, p. 132, t. 14, f. 32. Claib.

C. SOLITARIA (*Cerithium,*) C.—J. A. N. Sciences, viii., p. 147. i., 2d series, p. 232, t. 14, f. 28. Claib.

ARCHITECTONICIDÆ.

ARCHITECTONICA, Bolten.

A. ALVEATA (*Solarium,*) C.—Foss. Shells of Tert., p. 31. Claib.

S. bilineatum, Lea.—Cont. to Geol., p. 119, t. 4, f. 106.

A. AMÆNA (*Sol,*) C.—Foss. Shells of Tert., p. 44. Claib.

A. ANTROSA (*Sol.*) C.—*Ibid.*, p. 31. Claib.

A. CANCELLATA (*Sol.*) C.—A. J. Science, xxiii., p. 344. Claib. Lea.—Cont. to Geol., p. 121, t. 4, f. 110.

A. ELABORATA (*Sol.*) C.—A. J. Science, xiii., p. 344. Claib.

A. EXACUUA (*Sol.*) C.—Foss. Shells of Tert., p. 44. Cloib.

Delphinula plana, Lea.—Cont. to Geol., p. 117, t. 4, f. 104.

A. FUNGINA (*Sol.*) C.—Foss. Shells of Tert., p. 44. Claib.

A. HENRICI (*Sol.,*) Lea.—Cont. to Geol., p. 119, t. 4, f. 107. Claib.

A. Meekana, Gabb.—J. A. N. Sciences, iv., 2d series, p. 385,
A. ornata (*Sol.,*) Lea.—Cont. to Geol., p. 120, t. 4, f. 108.
t. 67, f. 40. Texas.
A. plana (*Delphinula,*) Lea.—Cont. to Geol., p. 117, t. 4, f. 104
A. pseudogranulata (*Sol.*) D'Orbig.—Prodrom., ii., p. 349. t. 192. Claib.
S. granulata, Lea.—Cont. to Geol., p. 122, t. 4, f. 111.
104. Claib.
A. scrobiculata (*Sol.,*) C.—Foss. Shells of Tert., p. 44. Claib.
A. stalagmium (*Sol.*) C.—Foss. Shells of Tert., p. 44. Claib.
S. elegans, Lea.—Cont. to Geol., p. 121, t. 4, f. 109.
A. Texana, Gabb.—J. A. N. Sciences, iv., 2d series, p. 384, t. 67, f. 38. Texas.
A. trilirata (*Sol.,*) C.—J. A. N. Sciences, i., 2d series, p. 113, t. 11, f. 4. Vicks.
A. vespertina, Gabb.—*Ibid.,* f. 39. Texas.

SOLARIORBIS, Conrad.

S. depressa (*Delphinula,*) Lea.—Cont. to Geol., p. 118, t. 4, f. 105. Claib.
S. bella, C.—Nov. Spec.
S. lineatus (*Turbo,*) Lea.—Cont. to Geol., p. 126, t. 4, f. 116. Claib.
S. nitens (*Turbo,*) Lea.—*Ibid.,* p. 125, t. 4, f. 115. Claib.

ORBIS, Lea.

O. rotella, Lea.—Cont. to Geol., t. 4, f. 112. Claib.

CONIDÆ.

CONUS, Lin.

C. alveatus, C.—Amer. Jour. Conch., 1865, p. 186. Vicks.
C. gyratus, Morton.—Org. Rem. Cret. Group, p. 49, t. 10, f. 13. (a cast.) South Carolina.
C. Sauridens, C.—Foss. Shells of Tert., p. 33. Claib.
C. Claibornensis? Lea.—Cont. to Geol., p. 186.
C. subsauridens, C.—Amer. Jour. Conch., 1865.
C. tortilis, C.—Proceed. A. N. Sciences, p. 260. Wailes' Geol., Miss., t. xv., f. 5. Jackson, Miss.

STROMBIDÆ.

LEIORHYNUS, Gabb.

L. Californica (*Pleurotoma,*) C.—Ex. and Surveys; Pac. Railroad, v., p. 322, t. 2, f. 11. California.
L. proruta (*Pleurotoma,*) C.—Foss. Shells of Tert., p. 51, t. 17, f. 15. Claib.
L. crassilabris, Gabb. —J. A. N. Sciences, iv., 2d series, p. 402, t. 67, f. 60.

PLATYOPTERA, Conrad.

P. EXTENTA (*Aporrhais,*) C.—Proceed. A. N. Sciences, vii., p. 260. Wailes' Geol. t. 16, f. 3.

APORRHAIS, Petiver.

SUBGENUS, ALIPES, Conrad.

A. LIRATUS (*Chenopus,*) C.—J. A. N. Sciences, i., 2d series, p. 117, t. 11, f. 35. Vicks.

CALYPTRAPHORUS, Conrad.

C. STAMINEUS (*Rostellaria,*) C. —Proceed. A. N. Sciences, p. 260. Wailes' Geol. Miss., t. 16, f. 9. Jackson.

C. TRINODIFERUS, C.—J. A. N. Sciences, iv., 2d series, p. 47, f. 29. Proceed. A. N. Sciences, 1857, p. 166. Alabama. Older Eocene?

C. VELATUS (*Rostellaria,*) C—Foss. Shells of Tert., p. 31, 2d edition, p. 38, t. 15, f. 4. Claib.

Rostellaria Lamarckii, Lea.—Cont. to Geol., p. 158, t. 5, f. 164. Claib.

RIMELLA, Agaz.

R. LAQUEATA (*Rostellaria,*) C.—Foss. Shells of Tert., p. 41. 2d edition, p. 38, t. 15, f. 5. Claib.

Rost. Cuvieri, Lea.—Cont. to Geol., p. 160, t. 5, f. 165.

Rimella laqueata, C.—Proceed. A. N. Sciences, 1857, p. 166.

CYPÆIDÆ.

CYPRÆA, Lin.

SUBGENUS, CYPRÆORBIS, Conrad.

C. SPHÆROIDES, C.—J. A. N. Sciences, 2d series, p. 11, t. 113, f. 6. Vicks.

SUBGENUS, SULCOCYPRÆA, Conrad.

C. LINTEA, C.—J. A. N. Sciences, i., 2d series, p. 11, t. 113, f. 7, and t. 13, f. 4. Vicks.

CYPRÆDIA, Swains.

C. FENESTRALIS, C.—Proceed. A. N. Sciences, vii., p. 262.—Wailes' Geol. Miss., t. 17, f. 5. Jackson, Miss.

CANCELLARIDÆ.

CANCELLARIA, Lam.

C. ALVEATA, C.—Foss. Shells of Tert., p. 45. 2d edition, p. 44, t. 16, f. 9. Claib.

C. sculpturata, Lea.—Cont. to Geol., p. 140, t. 5, f. 137.

C. BABYLONICA, Lea.—Cont. to Geol., p. 139, t. 5 f. 134.—Claib.

C. COSTATA, Lea.—Cont. to Geol., p. 141, t. 5, f. 140. Claib.

Subgenus, BABYLONELLA, Conrad.

C. elevata, Lea.—Cont. to Geol., p. 141, t. 5, f. 139. Claib.
C. funerata, C.—J. A. N. Sciences, i., 2d series, p. 118, t. 11, f. 39. Vicks.
C. gemmata, C.—Foss. Shells of Tert., p. 35, 2d series, p. 44, t. 16, f. 10. Claib.
C. impressa, C.—Amer. Jour. Conch., 1865. Claib.
C. lirata, C.—Amer. Jour. Conch., 1865. Texas.
C. Mississippiensis, C.—J. A. N. Sciences, i., 2d series, p. 118, t. 11, f. 38. Vicks.
C. multiplcata, Lea.—Cont to Geol., p. 139, t. 5, f. 135.—Claib.
C. parva, Lea.—Cont. to Geol., p. 142, t. 5, f. 141. Claib.
C. plicata, Lea.—Cont. to Geol.; p. 139, t. 5, f. 135. Claib.
C. tessellata, Lea.—Cont. to Geol., p. 140, t. 5, f. 138.—Claib.
C. tortiplica, C.—Amer. Jour. Conch., 1865. Texas.

CERITHIIDÆ.

CERITHIUM.

C ? Georgianum, Lyell and Sowerby.—Jour. Geol. Soc. London, i., p. 431. Wilmington, N. C.
C. siliceum, C.—J. A. N. Sciences, i., 2d series, p. 129, t. 41, f. 1. South Carolina.

VIVIPARIDÆ.

VIVIPARA, Mont.

V ? ————(*Paludina,*) Lyell.—Jour. Geol. Soc. London, i., p. 431. Wilmington, N. C.
(vivipara Lyelli, C.)

TURRITELLIDÆ.

TURRITELLA, Lam.

T. cælatura, C.— S. A, N. Sciences, i., 2d series, p, 114, t. 14, f. 16. South Carolina.
T. carinata, Lea.—Cont. to Geol., p. 129, t. 4, f. 12. Vicks.
T. humerosa, C.—Trans. Geol. Soc. Philadelphia, p. 340, t. 13, f. 3. Piscataway, Maryland.
T. Mississipiensis, C.—J. A. N. Sciences, iv., 2d series, p. 114, t. 11, f. 12. Vicks.
T. Mortoni, C.—J. A. N. Sciences, vi., p. 221, t. 10, f. 2. Maryland. Claib.
T. nasuta, Gabb.—J. A. N. Sciences, iv., 2d series, p. 385, t. 67, f. 42. Texas.
T. præcincta, C.—Proceed. A. N. Sciences, 1864, p. 211, Alabama.
T. uvasana, C.—Ex. and Survey; Pac. Railroad Route, v., p. 32,1 t. 2, f. 12. California.

MESALIA, Gray.

M. ALVEATA (*Turritella,*) C.—Proceed. A. N. Sciences, vii., p. 263. Wailes' Geol. Miss., pl. xvii., f. 7. Jackson, Miss.

M. LINTEA, C.—Nov. Spec. Claib.

M. OBRUTA (*Turritella,*) C.—Foss. Shells of Tert., p. 45. Claib.
T. lineata, Lea.—Cont. to Geol., p. 130, t. 4, f. 121.

M. STRIATA, Lea.—Cont. to Geol., p. 131, t. 4, f. 122.

M. VENUSTA (*Melania ?*) C.—Foss. Shells of Tert., p. 35.—Claib.

TENAGODA, Guettard.

T. VITIS (*Siliquaria,*) C.—Foss. Shells of Tert., p. 36. A. J. Science, i.. 2d series, p. 211, t. 1, f. 1. Claib.
Siliquaria Clairbornensis, Lea.—Cont. to Geol., p. 33, t. 1, f. 1.

ONUSTIDÆ.

ONUSTUS, Humphreys.

O. HUMILIS (*Phorus,*) C.—Proceed. A. N. Sciences, iii., p. 284. J. A. N. Sciences, 2d series, i., p. 116, t. 11, f. 46. Claib.

O. RECLUSUS (*Phorus,*) C.—Proceed. A. N. Sciences, vii., p. 262, t. 17, f. 6. Jackson.

CALYPTREIDÆ.

TROCHITA, Schum.

T. ALTA, C.—Proceed. A. N. Sciences, vii., p. 259. Wailes' Geol. Miss., pl. xv., f. 3. Jackson.

T. TROCHIFORMIS (*Infundibulum,*) Lea.—Cont. to Geol., p. 96, t. 3, f. 76. Claib.

CRYPTA, Humph.

C. DUMOSA (*Crepidula,*) C.—J. A. N. Sciences, vii., p. 148. Claib.

C. LIRATA (*Crepidula,*) C.—A. J. Science, xiii., p. 344. Claib.
Crep. cornu-arietis, Lea.—Cont. to Geol., p. 97, t. 3, f. 77.

CAPULIDÆ.

CAPULUS, Montfort.

C. AMERICANUS, C.—Proceed. A. N. Sciences, vii., p. 259. Wailes' Geol. Miss., pl. xv., f. 1. Jackson.

COCHLOLEPAS, Klein.

C. PYGMÆA (*Hipponyx,*) Lea.—Cont. to Geol., p. 95, t. 3, f. 75 Claib.

TROCHIDÆ.

PLANARIA, Lea.

P. NITENS, Lea.—Cont. to Geol., p. 124. t. 4, f. 113. Claib.

UMBONIUM, Link.

U. NANUS (*Rotella*,) Lea.—Cont. to Geol., p. 214, t. 6, f. 225. Claib.

TUBA, Lea.

T. ANTIQUATA (*Littorina*,) C.—Foss. Shells of Tert., p. 35. Claib.
T. striata, Lea.—Cont. to Geol., p. 128, t. 4, f. 117.
T. alternata; *T. sulcata*, Lea.—(young shells,) f. 118, 119.

FISSURELLIDÆ.

FISSURELLA, Lam.

F. MISSISSIPPIENSIS, C.—J. A. N. Sciences, i., 2d series, p. 113, t. 11, f. 2. Vicks.
F. TENEBROSA, C.—Foss. Shells of Tert, p. 33. Claib.

EMARGINULA, Lam.

E. ARATA, C.—Foss. Shells of Tert., p. 44. Claib.

DENTALIIDÆ.

DENTALIUM, Lin.

D. MINUTISTRIATUM, Gabb.—J. A. N. Sciences, iv., 2d series, p. 386, t. 67, f. 46. Texas.
D. MISSISSIPPIENSE, C.—J. A. N. Sciences, i., 2d series, p. 112, t. 11, f. 1. Vicks.
D. THALLOIDES, C.—Foss. Shells of Tert., p. 34. Claib.
D. alternatum, Lea.—Cont. to Geol., p. 34, t. 1, f. 2.
D. TURRITUM, Lea.—*Ibid.*, p. 35, t. 1, f. 3.

CHITONIDÆ.

CHITON, Lin.

C. ANTIQUUS, C.—Proceed. A. N. Sciences, vii., p. 263. Claib.
C. EOCENENSIS, C.—*Ibid.*, p. 263.

ACTÆONIDÆ.

ACTÆON, Montfort.

A. ANDERSONI, C.—J. A. N. Sciences, i., 2d series, p. 117, t. 11, f. 37. Vicks.
A. IDONEUS, C.—Foss. Shells of Tert., p. 45. Claib.
A. lineatus, Lea.—Cont. to Geol., p. 112, t. 4, f. 97.
A. POMILIUS, C.—Foss. Shells of Tert., p. 45. Claib.
Monoptygma elegans, Lea.—Cont. to Geol., p. 203, t. 6, f. 217.
A. PUNCTATUS, Lea.—*Ibid*, p. 111, t. 4, f. 96. Claib.

SUBGENUS NUCLEOPSIS, Conrad.

A. COSTELLATUS, C.—Foss. Shells of Tert., p. 45.
A. LATUS, C.—Amer. Jour. Conch., 1865.
A. SUBVARICATUS (*Actæonina*,) C.—J. A. N. Sciences, iv., 2d series, p. 294, t. 44, f. 22. Alabama.

CÆLATURA, Conrad.

C. STRIATA (*Pasithea,*) Lea.—Cont. to Geol., p. 102, t. 4, f. 83, Claib.

RINGICULA, Deshayes.

R. BIPLICATA (*Marginella,*) Lea.—Cont. to Geol., p. 201, t. 6. f. 216, Claib.

RINGINELLA, D'Orbigny.

R. MISSISSIPPIENSIS (*Ringicula,*) C.—J. A. N. Sciences, i., 2d series, p. 117, t. 18, f. 36. Vicks.

CYLICHNIDÆ.

CYLICHNA, Loven, 1840; CYLINDRELLA, Swainson, 1840.

C. CRASSIPLICA (*Bulla,*) C.—J. A. N. Sciences, i., 2d series, p. 113, t. 11, f. 5. Vicks.

C. DEKAYI (*Bulla,*) Lea.—Cont. to Geol., p. 200, t. 6, f. 215. Claib.

C. GALBA (*Volvaria,*) C.—Foss. Shells of Tert., p. 34. Claib. *Bulla St Hillarii,* Lea. Cont. to Geol., p. 98, t. 4, f. 78.

C. KELLOGII (*Bulla,*) Gabb.—J. A. N. Sciences, iv., 2d series, p. 386, t. 67, f. 50. Texas.

TORNATINA, Adams.

T. WETHERELLI (*Actæon,*) Lea.—Cont. to Geol., p. 213, t. 6, f. 224. Claib.

VOLVULA, Adams.

V. CONRADIANA, Gabb.—J. A. N. Sciences, iv., 2d series, p. 386, t. 51. Texas.

V. MINUTISSIMA, Gabb.—*Ibid.,* t. 52. Texas.

PLEUROBRANCHIDÆ.

OPERCULATUM, Lin.

O. PLANUTATUM (*Umbrella,*) C.—Proceed. A. N. Sciences, p. 259. Wailes' Geol. of Miss., pl. xiv, f. 1. Jackson.

Addenda.

RHYNCONELLA, Fischer.

R. WILMINGTONENSIS (*Terebratula,*) Lyell and Sowerby.—Quarterly Journal Geological Society, London, i., p. 431. Wilmington, North Carolina.

DESCRIPTIONS OF TWO NEW SPECIES OF GONIOBASIS.

BY JOHN G. ANTHONY.

1. G. TRANSLUCENS, Anthony.—t. 1, f. 1, 2.

Description.—Shell ovate, bulbous, consisting of five convex whorls; or the upper ones sometimes flattened. Aperture ovate, slightly produced and angular at the base. Columella curved to the right below. Shell thin, translucent, smooth; color light brown or yellowish, ornamented with two dark brown bands, which are very distinct both within and on the outside; the upper one is visible on the whorls of the spire. Columella frequently tinged with brown.

Length ·7, breadth ·35 of an inch.

Habitat, Canada.

This beautiful species is distinguished alike by coloration and texture from *G. livescens*, which it greatly resembles in form. *G. Milesii*, Lea, is a larger, more inflated species. *G. pulchella*, Nob., is far more solid, and a narrower species.

2 G. INTERLINEATA, Anthony.—t. 1. f. 3.

Description.—Shell thin, elongate, slender; of a greyish horn color, alternating with narrow, brown, hair-like lines, longitudinally and closely arranged; whorls 7-8 subconvex, smooth; sutures distinct; aperture small, elliptical, ashen gray within; columella regularly rounded, much curved at base, and with a faint indentation or notch where the outer lip meets it.

Length of shell ·62 inch. Length of aperture ·25 inch; breadth of shell ·25 inch; breadth of aperture ·15 inch.

Habitat, Christy Creek, Indiana.

A most beautifully delicate, slender species whose most prominent characteristic is indicated by its specific name. Upon a light grayish horn-colored surface we find narrow, brown, longitudinal, curved lines distinctly drawn. These are very conspicuous under the microscope, and appear to be slightly raised. It bears a general resemblance to *G. elata*, Nob., and *G. bicolorata*, Nob., but its peculiarly varied exterior will at once distinguish it from either. I know of no other American species so marked."

DESCRIPTION OF TWO NEW SPECIES OF GONIOBASIS.

BY S. S. HALDEMAN.

1. G. GRAMINEA, Haldeman.—t. 1, f. 4.

Shell fusiform, short, inflated, spire very obtuse; surface smooth, polished, brilliant green, with a light yellow sutural band; spire brownish. Whorls five, somewhat convex. Aperture large, rhomboidal, somewhat angular below, bluish within. Columella somewhat curved, tinged with brown.

Length ·56 inch., diam. ·3 inch. Aperture ·3 inch., diam. ·2 inch.

Habitat, unknown.

This shell is very closely allied to *G. Vauxiana*, Lea; but that species is banded, and the spire is carinated; it has not the light sutural band which distinguishes *graminea.*

2. G. CATABÆA, Haldeman.—t. 1, f. 5, 6, 7.

Shell short conic, inflated, the whorls flat, the body convex. bright green, polished. Sutures well impressed. Whorls five or six, encircled in the middle with two raised lines. Aperture ovate, bluish and translucent within, acuminate below. Columella nearly straight. Some of the specimens are marked in the centre of the body whorl with two very narrow dark approximate bands.

Length ·63 inch., width ·34 inch.

Length of aperture ·3 inch., width of ditto ·17 inch.

Habitat Catawba River, near Morgantown, North Carolina.

This species is nearest related to *G. proxima,* Say, which inhabits the same river. It is, however, a wider, more inflated species than *G. proxima.*

DESCRIPTION OF NEW SPECIES OF STREPOMATIDÆ.

BY GEORGE W. TRYON, JR.

GONIOBASIS HALDEMANI, Tryon.—t. 1, f. 8.

Melania acuta, Lea.—Bell, Canadian Nat., pt. 3, p. 213. Lewis, Boston Proceed., vi., p. 2.

Melania exilis, Hald.—Adams, Moll., Vermont.

Description.—Shell narrowly elongated, whorls nine, smooth, flat, the last subangulated at the periphery; aperture small, subrhomboidal, lip slightly sinuous, columella, incurved; color, light horn, not banded, yellowish within.

Length 1 inch; diameter ¼ inch.

Habitat, Lake Erie, Lake Champlain.

Observations.—Resembles *P. elevatum*, Say, but differs in the aperture, is still more narrowly elongated, and the whorls more flattened, and is entirely without striæ. In this last respect it differs widely from that species, and much resembles *P. Conradi*, Nob.

This species has long been known in our Cabinets as *G. exilis*, of Hald., but does not resemble that species in the remotest degree, as *exilis* is wider, with more convex whorls, and a larger aperture.

2. PLEUROCERA CONRADI, Tryon.—t. 1, f. 9.

Description.—Shell narrowly elevated, consisting of ten flattened whorls, narrowly but distinctly carinated and angulated on the periphery. The carinea are visible on each whorl of the spire above the suture. Upper whorls carinated. Two or three slight striæ revolve on the body below the angle. Lines of growth curved, very crowded. Aperture small, ovate, oblique, shortly and rather widely anger shaped at the base.

Color olive brown; carina yellow, with a yellowband below the sutures. Aperture and columella reddish

Length 1 inch; breadth ·25 inch.

Length of aperture ·25 inch; width of aperture ·15 inch.

Habitat, Tennessee and Alabama.

Observations.—This species has been very extensively distributed by Mr. Anthony, as *Melania pyrenella*, Conrad, while Mr. Lea has regarded it as doubtfully identical with his *elongatum.*

P. pyrenellum, as I have ascertained from an examination of the type specimen, is a very much wider species, measuring 1⅛ inch long, by ½ inch wide. It is of a light green color.

DESCRIPTIONS OF NEW SPECIES OF PHOLADIDÆ.

BY GEORGE W. TRYON, JR.

NAVEA, Gray.

1. N. NEWCOMBII, Tryon.—pl. 2, f. 1, 2, 3.

Description.—Shell subglobose, obtusely rounded posteriorly, diagonally truncate anteriorly, the sinus formed by the two valves broadly cordate, exhibiting the interior. Surface divided in the centre by an impressed line from the beaks to the basal margin. The margin of the valve posterior to this line is almost regularly semicircular, and devoid of striæ, except the growth marks. Anterior to the line the margin is diagonally emarginate, and the surface is covered with crowded shagrined radiating ribs. Margin of the hiatus thickened internally and denticulate. Apophysis long, blade shaped, curved forwards.

Dimensions.—Length ·25 inch; width ·30 inch; Diameter ·25 inch.

Habitat, Australia. Wesley Newcomb, M. D.

My Cabinet, Cabinet of Dr. Newcomb.

Observations.—Three other species of *Navea* have been described; the *N, nucivora* of Spengler is longer than wide, with a very small hiatus, *N. tenuis*, Gray is thin, and the anterior portion is only concentrically striate, instead of radiately ribbed. Our species is more nearly related to *N. subglobosa* Gray, but that shell may be distinguished from it by being longer than wide, with the hiatus nearly perpendicular, its margin but little curved, and by the paucity of ribs anteriorly.

PENITELLA, Valenciennes.

2. P. PARVA, Tryon.—pl. 2, f. 4, 5.

Description.—Shell small, ovate, inflated, rather thick. Surface divided by an oblique impressed rib, posteriorly to which it is concentrically striate, while anteriorly it is radiately ribbed.

The reflexed dorsal margins are each covered with a thick, irregularly shaped accessory valve, with a single central valve posterior to them. The latter is somewhat pentagonal, emarginate in front.

Hiatus filled by a heavy callus, which juts out somewhat into a point or beak, instead of preserving a rounded outline.

Dimensions.—Length ·33 inch; width ·50 inch; diameter ·30 inch.

Habitat, Lower California, in Haliotis.—W. Newcomb, M. D.

My Cabinet, Cabinet of Dr. Wesley Newcomb.

Observations.—Except in size this shell much resembles *P. penita,* Conr.; besides being much smaller than that species, it may be distinguished from it by its smaller anterior area, and its greater solidity.

3. P. CURVATA, Tryon.—pl. 2, f. 6, 7, 8.

Description.—Shell narrow, mnch lengthened, accuminate posteriorly. Surface marked as usual in the genus, the area anterior to the furrow, comprising rather more than a third of the total width. Posterior to the furrow, the shell is curved downwards or upwards, and frequently to one side. Posterior margin reflexed. Posterior dorsal plate very small, somewhat pentagonal, pointed anteriorly.

Dimensions.—Length ·30 inch: width ·70 inch; diameter ·28 inch.

Habitat, Straights of Fuca.—W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb. Cabinet of the Academy of Natural Sciences.

Observations.—This species, which comes from a quite northern locality, is readily distinguishable by its narrow elongate form, and by its curiously curved posterior portion and minute accessory valve.

These two new species of *Penitella* are particularly interesting additions to the Molluscous fauna of the West Coast, inasmuch as they prove the genus to be larger than was supposed, and variable in size and other characters; and also that it inhabits a considerable extent of the coast.

OBSERVATIONS ON THE GENUS IO.

BY GEORGE W. TRYON, JR.

The first species of this singular and beautiful genus was described by Mr. Say, nearly fourty years ago, as a *Fusus*.—He remarks, "From the name of the genus it might reasonably be supposed to be a marine shell, but it has never been discovered on the coast, and seems to be limited to a very small district of Holston River, in company with *Unio cariosus, subtentus*, Nobis; *Melania subglobosa*, Nobis, and no doubt other fluviatile shells. When the inhabitant becomes known it may authorize the formation of a new genus, but there appears no character in the conformation of the shell that would readily distinguish it from *Fusus*."

Mr. Lea, in describing *Io spinosa*, remarks, 'Prof. Troost informs me that they are rare in the river, that they had been observed in the graves of the aborigines, and it was generally believed that these were 'conch shells' consequently coming from the sea, it was urged that the inhabitants who possessed them must have come over the sea. It does not appear that they had been observed in their native element, though living at the very doors of the person who had remarked them in the tumuli.'

Mr. Lea proposed the generic name *Io* for these shells in 1831, and Swainson in 1840 called them *Melafusus*. Until the year 1860 only three species were known; in February of that year Mr. Anthony described, in the Proceedings of the Academy of Natural Sciences, four additional species.

Mr. Reeve published, in April of the same year, a magnificent monograph of the genus in his Conchologica Iconica, adding four more species by Mr. Anthony, and one of his own.

Mr. Lea has recently described eight species which he proposes to consider a distinct group of *Io*, but I cannot distinguish them from *Pleurocera*. The longer fuse, sharp lip and fragile texture of most of these species, shows them to be immature shells, and in several instances I had do difficulty in proving them identical with mature shells described by Mr. Lea as *Trypanostoma* (=*Pleurocera*,) by means of series of specimens of different ages.

Excluding these, twelve species have been described; of which we propose to retain five, regarding the others as synonyms.

Many naturalists consider the genus to be restricted to one variable species, and cite the nearly uniform size of the shells, their similar ornamentation and restricted habitat as proofs of the correctness of their opinion; there appears to us to be a well founded division of the species into two groups, the one containing shells which are smooth or obscurely tuberculate, and the second those developing distinct spines.

Endeavors have been made to connect *Io fluvialis* and *spinosa* the respective types of the two groups, by series of specimens, but no *fluvialis* has been found with better developed protuberances than the shell described by Mr. Reeve as *verrucosa*, which is still a long way from the *spinosa*. In the young shells the differences are very much better shown than in mature individuals, and no one would think of connecting the quite young of the two species. There are very many groups in the other genera of *Strepomatidæ*, in which the species resemble one another quite as closely as in *Io;* we may instance the close resemblance of *Angitrema armigera, Duttoniana* and *fasciolata*; of *verrucosa* Raf., (*nupera,* Say,) and *lima*; of *geniculata, salebrosa*, and *subglobosa;* of *Anculosa præerosa* and *tæniata;* of the species of *Schizostoma;* of the heavy cylindrical *Goniobases* of North Alabama; and many like instances will readily occur to those who have studied the family.

The following remarks on the species are illustrated by figures in most cases drawn from the original type specimens:*

SMOOTH SPECIES.

1. Io FLUVIALIS, Say.

Plate 3. Fig. 1, typical; fig. 2, variety; fig 3. *verrucosa*, Reeve.

Our figures exhibit the extreme range of variation in form and ornamentation; there is considerable variety in coloration, from light yellow, through various shades of light and dark green and brown, to black. Some specimens are beautifully banded. A very dark colored shell, not half grown, was described by Mr. Lea as a distinct species, with the name of *tenebrosa.*

He now agrees with me in considering it a synonym of *fluvialis.* In the description he remarks, "It seems to me to be very distinct in color. The channel is more curved to the left and backward, than in Mr. Say's species."

This distortion of the channel is of very frequent occurrence in the genus, sometimes giving it a spiral curve as in *Io spirostoma,* Anthony, and sometimes, when twisted higher up, causing a hump to revolve on the body whorl, as in *Io gibbosa,* Anthony.

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*I am indebted to the liberality of Prof. Jos. Henry, of the Smithsonian nstitution, for the opportunity of using these engravings.

Mr. Lea upon instituting the genus *Io* re-named the *fluvialis* as *fusiformis*, Lea, in accordance with a custom, very usual among naturalists, but very disreputable. He has recently done Mr. Say and himself the justice of restoring the original name,—an example worthy to be followed.

The *verrucosa* of Reeve is founded on a beautiful specimen, but presents no claims to rank even as a variety.

2. Io INERMIS, Anthony.

Plate 3. Fig. 4, typical; fig. 5, *lurida*, Anthony.

This is a very distinct species, being larger and of heavier texture than *fluvialis*. The *lurida* differs only in color, being much darker. Mr. Anthony perfectly agrees with me in considering it identical with *inermis*.

This shell is rather rare compared with *fluvialis* and *spinosa*, though Mr. Anthony states that he has observed some hundreds of them.

Io inermis was first published in the Proceedings of the Academy of Natural Sciences, 1860, and *lurida* in Reeve's Monograph.

SPINOSE SPECIES.

3. Io SPINOSA, Lea.

Plate 4. Fig. 7, typical; fig. 8, *gibbosa*, Anthony; fig. 9, *recta*, Anthony.
Plate 3. Fig. 6, *rhombica*, Anthony.

This species, originally described and figured in vol. v., Philosophical Transactions, has been well known to Conchologists for many years. The three synonyms were first published in Reeve's Monograph.

Io recta is a variety of very usual occurrence, and does not in any respect present distinct specific characters: *rhombica* is merely a half grown shell of the same general form.

Mr. Reeve in describing *gibbosa*, says, "The gibbous ridge which encircles the lower part of the body whorl of this species, 'is not,' writes Mr. Anthony, 'a mere accidental abberation, I have seen others like it.'"

The extensive suite of specimens that I have examined convinces me, nevertheless, that the gibbous ridge *is* "a mere accidental abberation," being found in all stages of development on specimens of *spinosa* which are otherwise distorted in growth, but never on perfect, well grown specimens.

4. Io BREVIS, Anthony.

Plate 4. Fig. 10, typical; fig. 11, *spirostoma*, Anthony.

This heavy short species offers many points of difference from *Io spinosa*.

The texture, form, short wide channel and broad obtuse spines are all prominent, distinctive characters. Mr. Anthony writes, "Appears to be a rather common species in some localities, of which I possess some hundreds of specimens."

The beautiful specimen which Mr. Reeve has described as *Io spirostoma* is only a distortion of this species. I have seen several specimens which exhibit the same form of growth in a less marked degree. Mr. Reeve himself suspects their specific identity.

5. Io TURRITA, Anthony.

Plate 4. Fig. 12.

This species is certainly further removed from the ordinary type of *Io* than any of the others; its graceful, slender form, long spire of many whorls, and sharp spines, serve readily to distinguish it. Mr. Reeve's fig. 19 *b*. of this species, does not represent it however, but is decidedly a *spinosa*. I have seen the original of this figure.

The species is a rare one. Mr. Anthony possesses only the type specimen, but several fine individuals occur in Mr. Lea's collection. A specimen is also in the Museum of the Academy of Natural Sciences.

NOTE ON THE BUCCAL PLATE (JAW,) IN CERTAIN GENERA OF THE FAMILY CYCLOSTOMACEA.

BY THOMAS BLAND.

Gray and Pfeiffer arranged the Cyclostomacea in various subfamilies, mainly distinguished by differences in the characters of the operculum. Troschel (*Gebiss Der Schnecken,* part 1, 1856,) with especial reference to the form and arrangement of the teeth on the lingual membrane, and considerations as to the buccal plate, divides the Cyclostomacea examined by him into three families, embracing the following genera:

POMATIACEA.—Gen. *Pomatias.*

CYCLOTACEA.—Gen. *Cyclotus, Craspedopoma, Cyclophorus* and *Rhegostoma.*

CYCLOSTOMACEA.—Gen. *Cyclostomus, Leonia, Chondropoma, Tudora, Choanopoma* and *Cistula.*

It is remarkable, and I believe not generally understood, that the buccal plate is found in *Pomatiacea* and *Cyclotacea,* but not in *Cyclostomacea.* My attention was lately directed to this subject by my friend, Mr. Robert Swift, of the Island of St. Thomas, W. I., who sent to me specimens of the buccal plate, taken and prepared for microscopic examination by himself, from the animals of *Cyclotus stramineus* and *Megalomastoma cylindraceum.* Troschel describes (p. 65) the jaw (*kiefer*) *of Pomatias patulus* as consisting of two thin laminæ, having 20 parallel rows of rhombodial scales of yellowish color, directed obliquely from the upper towards the anterior margin, to which 14 of the rows extend, causing it to be irregularly serrated. Towards the posterior margin the scales are less colored, more transparent, and disappear at some distance from the margin of the membrane, on which they seem to be inserted. In the single rows, the scales are always quadrate, or rather rhombical, becoming shorter, but more elevated towards the anterior magin.

The structure of the jaw in *Cyclotacea,* is said by Troschel (p. 66) to be entirely similar to that in *Pomatiacea,* indicating, as he remarks, a close relationship. He gives a figure (Taf. iv., fig. 3,) of the jaws of *Craspedopoma lucidum,* Lowe, observing that it agrees completely in organization with that of *Pomatias patulus.*

The jaw of *Cyclotus stramineus,* as shown by our figure 1. plate 5, accords with Troschel's description.

Troschel (l. c. p. 68) states that he had examined species of

Cyclostomus and of the other genera comprised in his Fam. *Cyclostomacea,* but found no jaw existing.

It is singular that Moquin-Tandom (*Moll. de France, II.*, p. 891) in describing his Fam. *Orbacês,* in which are embraced the species of *Cyclostomus,* (*sulcatus* and *elegans,*) and of *Pomatias,* occurring in France, gives as one of the characters "Machoire nulle;" he was correct, it would appear, as regards *Cyclostomus,* but in error as to *Pomatias.*

The characters of the jaws are peculiar. It may be noticed that *Megalomastoma* is placed by Pfeiffer in his Subfam. *Pupinea,* with *Registoma* (*Rhegostoma,* Troschel, which, as shown above, is included by Troschel in *Cyclotacea.* An examination of the jaw of *Cataulus* and other genera embraced in *Pupinea* may lead to interesting conclusions.

The alliance of *Megalomastoma* and *Cyclotus,* as regards the form and arrangement of the teeth on the lingual membrane, is shown by figure 2, plate 5, from examples of *Megalomastoma cylindraceum,* for which I am also indebted to Mr. Swift.

The characters of the operculum in the *Cyclostomacea* are doubtless of value in classification, but a complete examination of the animals will probably lead to modifications of the methods adopted by Gray and Pfeiffer. The presence or absence of the jaws would seem to be of equal, if not of more characteristic value than differences in the operculum.

Troschel states that in the Fam. *Helicinacea* no jaw exists. Whether it is found or not in the Fam. *Proserpinacea,* I am unable to say.

NOTE.—The figures are from drawings made by Mr. Edward S. Morse, of Gorham, Me., to whom, for his skill and care, in making the necessary microscopic examination of the objects, I am under much obligation.

NOTE ON THE JAWS OF HELICES.

BY W. G. BINNEY.

In examining the jaws of the North American Helices, I have been struck with the want of uniformity in the number and disposition of the ribs on the anterior surface in different individuals of the same species. To call attention to the subject, and guard against too much reliance on the number of ribs as a specific character, I have here figured (plate 6, figs. 2,—10,) the jaws of nine inviduals taken at random, from a number of *Helix tryoni*, Newc., received from Dr. J. G. Cooper. All the individuals were apparently mature.

I mention this as in his work on the Mollusks of France, Moquin-Tandon remarks that young individuals of the genus *Helix* have fewer ribs upon the jaw than adult, or aged ones, that the central ribs appear first, their number increaing from the centre towards the extremities, so that the appearance of the denticles on the margin of the jaw follows the same order as prevails in the dentition of the superior vertebrates. He also observes that in the case of some species furnished with but few, widely separated ribs, there are accessory, but not very prominent ribs formed in the intervals, when the animal becomes aged. The arrangement of the ribs in the jaws figured does not seem to be governed by these laws.

Fig. 1 represents the shell of the species from which the jaws were taken. This and the other figures are used by Iermission of Prof. Henry in anticipation of the Smithsonian pnstitution's work on the Land and Fresh-water Shells of North America.

DESCRIPTION OF THE GENUS ARIOLIMAX, MORCH*.

BY W. G. BINNEY.

Plate 6, Figures 11, 12, 13.

Body attenuated towards the posterior extremity, which is carinated strongly. Surface with oblong tuberosities. Mantle anterior bluntly truncated before and behind, minutely granulated, free at the front and sides, attached posteriorly, containing a testaceous rudiment. Longitudinal furrows along the sides above the foot. Locomotive disk? Respiratory orifice at the posterior third of the shell. Anal orifice? Orlfice of the generative organs—? A caudal mucus pore.

Testaceus rudiment hexagonal longer than wide, ends pointed acutely, not spiral.

Jaw arcuate, with numerous crowded anterior ribs, denticulating the concave margin.

Lingual membrane, (of *A. Columbianus,*) very broad and long, composed of about 120 rows of teeth, each row containing 113 teeth, 56–1–56. Central teeth, large, with a long medean cusp. Side cusp obsolete; lateral teeth bicuspid, the inner cusp longer and more slender than the outer, and becoming proportionally still more slender and lengthened as the teeth are modified in passing off laterally.

This genus is founded on the large species inhabiting the Pacific States, known as *Limax Columbianus.* It is readily distinguished from *Arion* by its internal shelly plate, and the position of the respiratory orifice; from Limax by its dentate jaw. The only species of *Geomalacus* yet known has an internal plate, but its respiratory orifice is much more anterior.

The figures are used by permission of Prof. Henry, in advance of the "Landand Fresh-waterShells of North America," being prepared by the Smithsonian Institution.

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* Mandidulum costatum; porus caudalis Arionis; corpus postice carinatum; orificium respiration in tertia parte postica clypei situm. Testa interna hexagonalis.—*Morch. Malak, Blatt.* vi., 110.

DESCRIPTIONS OF NEW SPECIES OF NORTH AMERICAN LAND AND FRESH WATER SHELLS.

BY W. G. BINNEY.

The following descriptions are published in advance of the work on the North American Land and Fresh Water Shells, being prepared for the Smithsonian Institution. Prof. Henry has kindly permitted the use of the figures engraved for that work.

VIVIPARA INORNATA, Binney.—t. 7, f. 1.

Description.—Shell minutely perforated, globose-conic, thin, smooth, polished, lines of growth extremely delicate on the body whirl, imperceptible above; color uniformly greenish or pale olive, unadorned with any revolving lines; the suture impressed, spire short, conical; apex acute, distinct, not truncated, whirls regularly increasing, inflated, the last globose, equalling about two-thirds of the shell's length; aperture oblique, rounded, large; lip continuous in one plane; peristome thin, acute, continuous; columellar extremity appressed to the body whirl, almost entirely concealing a minute umbilicus; parietal wall of the aperture covered with a thin, shining, colorless callus.

Length of axis 19 mill., breadth 17 mill.

Habitat, near Chopatilo, Mexico.

It is after a very careful examination of the specimens brought from Chopatilo, that I have decided to propose for them a specific name. Having submitted them to several experienced Conchologists, I find my decision approved by them. It can be compared with no known American form.

The smooth, polished surface, unbroken by revolving lines, the pale olive color and acute apex, are the more prominent features of it.

About a dozen specimens were brought. On one is an obtuse, ill-defined carina on the middle of the body whirl.

MELANTHO DECAMPI, Currier.—t. 7, f. 2, 3.

Description.—Shell ovate, oblong, imperforate, rather thick, irregularly roughened by occasional coarse wrinkles of growth, decussated by delicate revolving and longitudinal striæ; greenish olive, with revolving dark broad lines when young, darker when old; suture impressed, spire elevated, but truncated; remaining whirls, three, of which the two upper are flattened, the lower sub-convex, with a median obtuse carina, reaching to and modifying the peristome; aperture higher than broad, roundly lunate, produced below; bluish within; peristome simple, acute, sinuous, angular above at the termination of the carina.

Greater diameter, including aperture, 22 mill.; length, 35 mill.; length of the aperture, 20 mill.; diameter, 10 millimetres.

Operculum horny, concentric.

Habitat, Huntsville or Stevenson, Alabama.—Dr. W. H. DeCamp, 1st Michigan Vol. Engineers.

This species was given me by Mr. A. O. Currier, of Grand Rapids, Michigan, who suggested its bearing the name of its discoverer.

About a dozen specimens were collected. All but the one drawn in plate 7, fig. 3 could not be distinguished from *Melania* without the presence of the operculum, thus furnishing another example of the impossibility of ascertaining from the shell alone the generic position of some species. It is probable other species of *Melantho* have been described as *Melaniæ.*

Fig. 2 was photographed from nature on wood. It represents the largest and oldest specimen. Fig. 3 is drawn from a younger individual.

CYLINDRELLA COAHUILENSIS, Binney.—t. 7, f. 4, 5.

Description.—Shell rimate, cylindrically ventricose, thin, smooth or delicately striate on the upper whirls, strongly ribbed on the last two; white, composed of twelve ventricose or flattened whirls; apex obtuse, shining, upper three whirls of about equal diameter and smooth, the next four rapidly increasing in width and striate, the next whirl the widest of all and smooth, the remainder very rapidly decreasing in diameter towards the attenuated base; last whirl with about ten elevated ribs, not carinated below, and appressed against the shell so as hardly to be rimate, until extended beyond it, and ending in a continuous peritreme expanded around the subquadrate aperture.

Greatest diameter, 7; length, 29 millimetres.

Habitat, Cienga Grande, Coahuila. Four specimens are preserved in the collection of the Smithsonian Institution.

Plate 7, fig. 5, is an enlarged view of the apex of this species. It belongs to the sub-genus *Gongylostoma.*

Genus CARINIFEX, Binney.—t. 7, f. 6, 7.

Description.—Jaws—? Lingual membrane—? Tentacles—? Mantle—?

Shell, dextral, spiral, somewhat triangular, strongly carinated, deeply and widely umbilicated, horn-colored, spire flattened, terraced, last whirl triangular, strongly carinated above; aperture small, wide above, narrowed, acute below; inner lip with a thin callus; outer lip simple, sinuous, angular.

In the catalogue of North American Pulmonates, published by the Smithsonian Institution, December 9th, 1863, I proposed the generic name *Carinifex** for a shell described as *Planorbis newberryi*, Lea, (Proceedings Philadelphia Academy Natural Sciences, 1854, p. 41.) It is somewhat related to *Taphius*, but has not the excavated upper surface or rounded whirls of that subgenus, and the aperture is below the plane of the whirls.

Two species of the genus have been described, *C. newberryi*, and *C. breweri*, Newcomb. The latter may prove but a variety of the former. In the Smithsonian Institution's collection are specimens from Klamath Lake, Canoe Creek and Clear Lake, California.

BULINUS BERLANDIERIANUS, Binney.—t. 7, f. 8.

Description. — Shell cylindrical, smooth, whitened, rather thick; whirls five, the upper ones narrowly flattened, the lower one comprising more than 15-17 of the whole length of the shell; quite compressed; aperture very long, narrow; columella simple, with a light callus.

Length of the shell 17, greatest breadth 8, of aperture length, 14, breadth 4 millimetres.

Habitat, Texas, in the region of Metamoras.

Six specimens were presented to the Smithsonian Institution by Gen. Couch, among the shells collected by Berlandiere.

This species resembles *Bulinus elatus*, Gld., more than any other known to inhabit North America. But that species is very much thinner and delicate, has a longer, more pointed spire, a shorter aperture and more convex body whirl.

Fig. 9 is drawn from the largest American specimen of the widely distributed *Bulinus hypnorum*. It shows how slight is the resemblance to that species in *B. berlandierianus*.

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* Subsequently, (January, 1864,) Mr. Lea proposed the generic name *Megasystropha* for the same shell. (Proceedings Philadelphia Academy, 1864, p. 5).

DIAGNOSES OF NEWLY DISCOVERED GENERA OF GASTEROPODS, BELONGING TO THE SUB-FAM. HYDROBIINÆ, OF THE FAMILY RISSOIDÆ.

BY DR. WILLIAM STIMPSON.

COCHLIOPA.*

Shell depressed-conic; base concave, carinated; umbilicus large and deep; aperture oblique.

Operculum thin, corneous, subspiral.

Rostrum of moderate size; tentacles rather long, tapering. Verge geniculated and bifid, the inner branch being very small, less than one-fourth the size of the outer and arising at the inner angle of the geniculation.

Lingual dentition of the typical species:—Rhachidian tooth short and broad, armed with two denticles on each side of the base, and eleven denticles at the cusp. Intermediate tooth with a long peduncle and square body, having a cavity in the centre; cusp with eight denticles. Lateral teeth with an expansion of the inner side of the shank, separated from the summit by a deep rounded sinus; inner lateral with eighteen, outer one with twenty-four denticles at the summit.

Station.—Fresh water.

Distribution.—California.

Type, C. Rowellii.

Amnicola Rowellii Tryon, Proc. A. N. Sciences, Philadelphia, 1863, p. 147, pl. i., f. 8, 9.—Clear Lake, California.

FLUMINICOLA.

Shell comparatively large, obliquely ovate, thick, smooth, imperforate; spire short, obtuse; aperture ovate, inner lip flattened, callous; outer lip effuse and projecting anteriorly, so that the peritreme is not in the same plane.

Operculum corneous, subspiral.

Foot short, broadly rounded behind. Tentacles tapering. Rostrum large. Verge compressed, with a broad, semicircular, laminiform expansion or wing at the left side.

Lingual ribbon (of type) with the rhachidian tooth twice as broad as long, and trilobate below; cusp armed with five denticles; basal denticles, three on each side. Intermediate tooth armed with six denticles at the summit; inner lateral with ten, outer lateral with seven.

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* Κόχλὶς, *cochlea parva; ὀπη, foramen.*

Ova deposited in circular groups, enclosed in a common corneous envelope or capsule.

Station.—Fresh water.

Distribution.—Oregon and California.

Type, F. NUTTALLIANA.

Paludina nuttalliana Lea.—Trans. Amer. Philos. Soc., vi., 1839, p. 101, pl. xxiii., f. 89.

The *Paludina virens* Lea, *P. nuclea* Lea, *P. seminalis* Hinds, and *Amnicola Hindsii* Baird, will fall into the same genus.

GILLIA.

Shell rather large, subglobular, thin, subperforate, smooth; spire small; suture not impressed; aperture large, broad, ovate, oblique, with the outer lip thin, acute, and not projecting anteriorly.

Operculum subspiral, thin, corneous, regularly ovate.

Foot oblong, broadly rounded behind, and strongly auriculated in front. Rostrum rather large. Tentacles tapering, pointed. Verge small, simple, lunate.

Lingual dentition of type:—Rhachidian tooth deeply trilobate below, with the outer angles much produced; cusp with nine denticles; basal denticles two on each side, rather close to the basal margin, and projecting beyond it. Intermediate tooth with the body subrhomboidal, slightly excavated at the middle, and the peduncle as long as the body, but only half as broad. Inner lateral tooth with fourteen denticles; outer lateral with ten.

Ovacapsules hemispherical, each containing but one egg, and deposited singly or in groups, or linear series.

Station.—Fresh water.

Distribution.—North America, east of the Alleghanies, from Pennsylvania to Georgia.

Type, G. ALTILIS.

Melania altilis Lea, Trans. Amer. Philos. Soc., VIII., 1843, p. 174, pl. v., f. 23.

POTAMOPYRGUS.

Shell ovate-conic, imperforate; apex acute; whorls coronated with spines; outer whorl nearly two-thirds the length of the shell; aperture ovate, outer lip acute.

Operculum corneous, subspiral.

Foot rather short for the length of the shell, broadest in front and strongly auriculated. Tentacles very long, slender, and tapering. Eyes on very prominent tubercles. Rostrum of moderate size.

Lingual dentition of type:—Rhachidian tooth trapezoidal, with the inferior or basal margin nearly straight, only faintly trilobate; cusp with nine denticles; basal denticles minute, four in number on each side, close to the lateral margins. Intermediate tooth with the peduncle very long, three times as long as the body and constricted at its juncture therewith; body subrhomboidal and excavated in the middle; cusp with eleven equal denticles. Lateral teeth constricted near the summits; inner lateral with fifteen denticles at the summit; outer lateral with the summit broad, shaped like a chopping-knife, and armed with twenty denticles.

Station.—Fresh water.

Distribution.—New Zealand.

Type, P. COROLLA.

Amnicola corolla Gould, U. S. Expl. Expedition, Moll., 1852, p. 129, pl. ix., f. 149, a. c.

TRYONIA.

Shell perforate, elongated, turreted, subulate, acute at summit and rather pointed at base; surface longitudinally ribbed or plicated, not spinous; whorls numerous, shouldered; aperture small, oblique, rhombo-ovate, somewhat pointed, sinuated and effuse at base; outer lip thin and sharp, projecting below; inner lip appressed to the whorl above; peritreme continuous.

Station.—Fresh water.

Distribution.—Southern California.

Type, T. CLATHRATA, nov. sp., pl. 8, f. 1.

Description.—Whorls eight. Longitudinal ribs variable in number, usually about twelve to each whorl. Surface otherwise smooth, or marked with delicate incremental striæ. There is no trace of revolving lines or striæ.

Length 0·2 inch.

The specimens described are in a semi-fossilized condition, mostly white, though not chalky, but with an ivory-like hardness. Some of them are translucent, looking as if silicified. From the circumstances under which they were found, however, it is probable that the species existed within a very recent period, if not indeed now living.

Large numbers of specimens were found, in company with other dead fresh water shells, in the Basin of the Colorado Desert, by Mr. Wm. P. Blake. This basin is the bed of an ancient lake, now dry.

ON CERTAIN GENERA AND FAMILIES OF ZOOPHAGOUS GASTEROPODS.

BY DR. WILLIAM STIMPSON.

Fam. CYSTISCIDÆ.

The characters of the soft parts, in the the new genus described below, seem to warrant the establishment of a distinct family for its reception, notwithstanding the great similarity to the Marginellidæ shown in the shell and lingual dentition.

CYSTISCUS, nov. gen.—pl. 8, f. 2.

Shell (plate 6, fig. 2, *a*, *b*,) resembling that of some *Marginellæ* or *Persiculæ*, small, thin, ovate, inflated, smooth and polished; spire very short, but distinct; suture not impressed, but filled up with a glossy deposit of shelly matter; aperture narrow; columella with plaits on the anterior half. Foot (fig. 2. *d*,) elongated, narrower than the shell, and truncated in front; head oblong, depressed, bifurcated in front to form the short, triangular, flattened and horizontal tentacles; eyes at the lateral margins of the head, a little behind the bases of the tentacles: mentum as broad as the head, but not extending beyond the tips of the tentacles. Teeth of the lingual ribobn (fig. 2. *c*,) in a single row, 0· 1· 0, and resembling in form the rhachidian teeth of the Muricidæ[*], thick and strong, with seven unequal, conical denticles[†] on its upper surface, of which the central, and two outer ones on either side are large, and project slightly beyond the anterior margin.

In the examination of the living animal, it was unfortunately not determined whether the shell is covered externally by an expansion of the mantle as in the Marginellidæ, but this is probably the case, judging by the character of the surface of the shell and the filling up of the suture. This pallial envelope, if existing, must be very thin and delicate, and not ornamented with tubercles or fringes, otherwise it would not have easily escaped observation. The form of the respiratory siphon also remains to be ascertained.

CYTISCUS CAPENSIS, sp. unica, nov. (plate 8, fig. 2,)

Shell four-whorled, white, translucent; the contained bluish viscera showing through in living examples. Columella with four-folds beside that forming its basal extremity or truncation. Foot lemon yellow; eyes minute, dark reddish.

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[*] As restricted further on, to *Murex*, *Trophon*, etc.

[†] There were eight denticles in the specimen figured, producing a want of symmetry doubtless merely accidental.

Length of the shell 0·14; width about 0·10 inch.

Found on Gorgoniæ dredged by the writer from a rocky bottom in 20 fathoms, in False Bay, Cape of Good Hope, North Pacific Expl. Expedition, Com. C. Ringgold, U. S. N., Commanding.

Fam. MURICIDÆ.

This group has been used with several very different limitations by recent malacological writers, and requires careful revision, toward which we have some suggestions to offer.

Woodward* includes in the family the genera *Murex*, *Typhis*, *Pisania*, *Ranella*, *Triton*, *Fasciolaria*, *Turbinella*, *Cancellaria*, *Trichotropis* and *Fusus* (=*Colus*.) H. & A. Adams† include *Murex*, and its recent subdivisions (*Chicoreus*, *Phyllonotus*, *Vitularia*, *Ocinebra*, *Muricidea*, etc.,) *Trophon*, *Fusus* (=*Colus*,) *Neptunea*, *Clavella*, *Pisania*, *Metula*, *Cassidulus*, *Hemifusus*, *Cantharus* (=*Pollia*,) *Tritonidea* and *Euthria*. Gray‡ assigns to the family his groups, Muricina, Colusina, Pisaniana, (including *Columbella* and *Engina*,) Cominellina, Nassina and Phosina. Carpenter§ restricts it to the genera *Murex* and its allies, *Trophon*, *Fusus* (=*Colus*,) *Chrysodomus* (=*Neptunea*,) *Clavella*, *Pisania*, *Engina*, *Cominella*, *Metula* and *Anachis*.

We thus have representatives of ten families (Muricidæ, Buccinidæ, Cassidulidæ, Nassidæ, Columbellidæ, Fasciolariidæ, Turbinellidæ, Trichotropidæ, Cancellariidæ and Tritonidæ,) and of three distinct suborders, (Haniglossata, Toxoglossata and Taenioglossata,) referred to the Muricidæ by one or other of the different authors quoted.

From this long list we will proceed to eliminate as follows:—The reference by Woodward of the Taenioglossate *Ranella* *Triton*, *Trichotropis* and *Pyrula* (=*Ficula*, Sw.,) and of the Toxoglossate *Cancellaria* to the group is not surprising, since the importance of the characters of the lingual dentition in classification was not generally understood at the time when the first part of that author's excellent and comprehensive work was published. The same remark will apply to the Odontoglossate *Fasciolaria* and *Turbinella*, which have been since referred to their proper place by H. & A. Adams, Gray and Carpenter.

But the family, as understood by these three authors, requires still further reduction. *Colus,* as we have recently determined by the examination of the teeth of a species allied to the type, *Fusus colus* Lam., belongs to the Fasciolariidæ, *Bullia, Nassa, Phos,* and their allies, included in the group by Gray have been very properly separated by H. & A. Adams and Carpenter. *Cassidulus* and its allies, included by H. & A. Adams, is properly separated by Gray and Carpenter. Certain Columbellidæ included by Gray and Carpenter, are properly separated by H. & A. Adams. The Columbellidæ have, in their unarmed rhachidian and claw-shaped lateral teeth, a peculiar and singularly constant type of lingual dentition*, which forbids the dismemberment of the group on account of differences in the shape of their opercula.

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* Manual of the Mollusca, 1851, p. 106.

† Genera of Recent Mollusca, I., 1853, p. 70.

‡ Guide to the Syst. Distr. of Mollusca, 1856, p. 11.

§ Lectures on Mollusca, 1861, p. 27.

We have then remaining to the family the genera *Murex, Typhis, Trophon, Neptunea, Strombella, Clavella, Pisania, Pollia, Tritonidea, Engina, Metula* and *Euthria,* none of which have been referred to any other family by the most recent scientific authors. Among these, however, we find two distinct types of lingual dentition.

1. In *Murex* and the two genera following, the lingual ribbon (plate 8, fig. 3,) is very small; the rhachidian tooth is thick and solid, somewhat like a section of a prism, with the denticles projecting from the anterior edge of the convexity of the upper surface; while the lateral teeth are always simple, with but a single dentiform lobe arising from the base of attachment.

2. In *Neptunea* and the six genera following, the lingual ribbon (plate 8, fig. 4,) is much larger and broader in proportion; the rhachidian tooth is flat and lamelliform, with denticles arising directly from the anterior margin; while the lateral teeth are each armed with at *least* two strong dentiform lobes. This dentition closely resembles that of the Buccinidæ.

There is thus a far greater difference between the dentition of the *Murex*-group, and of the *Neptunea*-group than between that of this latter group and that of the Buccinidæ. We therefore propose to restrict the limits of the family Muricidæ to the genus *Murex* and its allies, and to place the *Neptuneæ,* etc., in the family Buccinidæ as a sub-family Neptuniinæ.

The dentition of *Metula* and *Euthria* is as yet unknown, so that their true place remains uncertain.

After so wholesale a depauperization of the family Muricidæ, we can do no less than endeavor to make amends by seeking for the genera which, though properly belonging to it, may have been wrongly placed in other families.

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* See Moerch's investigations upon the lingual teeth of the Columbellidæ. Journal de Conchyliologie, VII., 1858, p. 254.

As a commencement of this portion of the work, we may mention the group of shells of which the *Ranella caudata* of Say, and the *R. muriciformis* of Broderip are examples, which was named *Eupleura* by H. & A. Adams,* as a subgenus of *Bursa* (*Ranella*). This group, which forms a good genus, proves to be nearly allied to *Ocinebra*. We add a figure of the lingual dentition of *E. caudata*. (plate 8, fig. 5.)

To the Muricidæ we have also the following genus to add, which appears to have as yet received no name.

UROSALPINX,† nov. gen.

Type, U. CINEREA.

Fusus cinereus Say, Amer. Conch., pl. xxix., the two middle figures.

Shell elongated oval, or short fusiform, longitudinally ribbed or undulated and spirally striated; aperture with a short canal. Operculum somewhat like that of *Purpura*, semi-cordate, with the nucleus at the outer edge a little below the middle. Lingual dentition (plate 8, fig. 6) nearly like that of *Trophon*, the lateral teeth having an elongate base of attachment; but the rhachidian tooth has numerous minute denticles between the principal ones, corresponding to ridges on the surface of the tooth, as in the Murices. Ova-capsules (fig. 7) oblong, shouldered, widest near the summit, compressed, carinated on either side, peduncle short; base of attachment very small; aperture median at the summit.‡

It differs from *Trophon* in its operculum, and from *Ocinebra* in its smoother shell, want of varices, and open canal.

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* Genera of Recent Mollusca, I., p. 107. It is doubtful whether we are required to adopt the name *Eupleura*, and several others among the names given by H. & A. Adams to groups of shells supposed to be of generic value. For, in the cases referred to, the authors cannot strictly be considered to have given a determinable type or example, which is necessary for the acceptance of a generic name by the scientific world. They indeed give a list of species, with authorities, but without references to descriptons, and with no mention of the genus to which the species was originally referred. For instance, the first species of *Eupleura* mentioned is simply "*caudata*, Say"; but we may search in vain through Say's works for any such name as "*Eupleura caudata*," or even "*Bursa caudata*." Out of courtesy, indeed, many of the names so proposed by H. & A. Adams will be adopted when the genera prove to be good, if collateral knowledge enables us, as in the present instance, to form a tolerably correct surmise as to the type; but it is highly desirable that the typical species should be much more clearly indicated in future.

† *Οἰρὰ, cauda; σάλπιγξ, buccina.*

‡ In the form of the ovacapsules we find an important difference between the Muricidæ and the Buccinidæ. In the former group they are more or less pedunculated and erect, while in the latter they are flattened, discoidal, adhering by the broad flat base, and generally occur piled upon one another in masses.

The typical species has been considered by some as a *Fusus*, on account of the length of the canal, by others as a *Buccinum*, on account of the form of the operculum. It is described by Gould in the "Invertebrata of Massachusetts," under the name of *Buccinum plicosum*. Its dentition proves it to belong to the Muricidæ. It is littoral in its habits and is found on the Eastern coast of the United States, from Maine to Florida.

FAM. PTYCHATRACTIDÆ.

This new group is proposed for the reception of the following genus, which will not fall into any of the Hamiglossate families as yet named. Its dentition resembles that of the Purpuridæ more than that of any other family, but the form of the shell and operculum forbid its approximation to that group.

PTYCHATRACTUS*, nov. gen.

Type, P. LIGATUS.

Fasciolaria ligata Mighels & Adams. Boston Journal Natural History, IV., 1842, p. 51, pl. iv., f. 17.

Shell fusiform, spirally striated; aperture with a rather long canal; columella plicated as in *Fasciolaria*. Operculum like that of *Neptunea*. Lingual teeth, (plate 8, fig. 8,) 1· 1· 1; rhachidian tooth deeply arched, with three strong denticles at the middle of the anterior edge; lateral teeth versatile, greatly elongated, simple, with a swollen base and hook-shaped extremity.

This mollusk, in the character of its lingual dentition, is widely removed from the Fasciolariidæ, in which the lateral teeth are not versatile. The only known species is found in deep water, off the coasts of Maine and Nova Scotia, and has also occurred in the Gulf of St. Lawrence.

Fam. BUCCINIDÆ.

Sub-fam. NEPTUNIINÆ.

Shell more or less beaked. Operculum ovate, nucleus apicial.

The *Neptuniæ* and their allies are so very closely allied to the true *Buccina* in their lingual dentition, in the form of the soft parts and of the ovacapsules, and in many other characters, that they should doubtless be arranged in the same family. They may, however, be kept separate from the *Buccinum* group, as a subfamily, on account of the different form of the operculum, the canaliculated aperture of the shell, and the position of the eyes.

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* *πτὺξ, plica, ἀτράκτος, fusus.*

To the sub-family Neptuniinæ as separated from the Muricidæ on a previous page, we have to add two genera which have been erroneously placed, hitherto, in widely different groups.

PERISTERNIA Moerch.

The first of these is *Peristernia* of Moerch,* which has been referred to the Turbinellidæ. In this genus, however, the lateral teeth of the lingual ribbon are versatile, and the entire structure of the animal is similar to that of *Neptunea.* We add a figure (plate 9, fig. 9,) of the teeth of a species found on the coast of Georgia.

This case, with that of *Ptychatractus* and *Colus,* will serve to show that by far too much dependence has been placed, in classification, upon the presence or absence of folds upon the columella of the shell.

BUSYCON Bolten.

To the *Neptuniinæ* we have also to refer the genus *Busycon* of Bolten (=*Fulgur,* Montfort.) The systematic position of this genus has been thus far involved in doubt. Dr. Gray places it in the Cassidulidæ.†

Dr. P. P. Carpenter makes the following remarks‡ with regard to this very natural group of large gasteropods, which is confined, geographically, to the eastern shores of America. "Whether it speaks well for the zeal of American Naturalists that these large species, which can be so easily examined, should be abundant in collections as far as the shell is concerned, but as yet undescribed from the living animals, must be for others to determine." And further:—"Whether they have a whelk-like dentition, or whether they are Fasciolariæ with undeveloped plaits, cannot be told till their animals have been dissected."

Having recently had an opportunity of examining the animals in question, we hasten to remove the stigma upon "the zeal of American naturalists," who, unlike their European brethren, are surrounded by such an abundance of new materials, that it is hardly surprising that so much lies uninvestigated at their doors. We cannot do everything at once. Dr. Carpenter's first conjecture is right—the Busycons have a "whelk-like dentition." Pl. 9, fig. 10 represents that of *B. pyrum.* In this species we have a rather narrow rhachidian tooth, armed with three strong denticles, and a 4-denticulate lateral tooth. In *B. canaliculatum*, the rhachidian tooth is broader, with three denticles smaller than in *B. pyrum*: lateral tooth 5-denticulate. In *B. carica* the rhachidian is still broader and armed with five denticles in the female and six in the male; lateral tooth 5-denticulate (♀) or 6-denticulate (♂.) In *B. perversum* ♂, rhachidian 5-denticulate, lateral tooth 6-denticulate.

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* Cat. Yoldi Coll., 1852, p. 99. Type *Turbinella craticulata* Schubert & Wagner; Kiener pl. ix., f. 2.

† Guide, I., p. 11.

‡ Lectures on Mollusca, p. 32.

Besides these four species, a few others have been described *B. carica.* The four species may be arranged in two groups as existing on our coast, but these appear to be all varieties of upon the characters of their shells. *B. carica* and *B. perversum* have rather thick and heavy shells, with the shoulder of the whorls armed with strong spines; *B. pyrum* and *B. canaliculatum* have on the contrary thin, canaliculated shells with unarmed whorls and a ciliated epidermis. These differences, taken in connection with those to be noticed in the lingual dentition, might lead us to separate the two groups generically, were it not that in the Miocene formation of our Atlantic slope we find intermediate forms. For instance, the *B. coronatum* of Conrad has the thick shell and prominent conical spines of the first group in conjunction with the spiral canal of the second; *B. carinatum* of the same author has a thin smooth shell, but no spiral canal; and *B. fusiformis* has a thick shell, while the whorls have neither canal nor spines.

Fam. NASSIDÆ.

We regard the *Nassæ* and their allies as forming a family distinct from the Buccinidæ on account of the arched form and very numerous denticles of the rhachidian tooth of the gual ribbon,—a constant character.

ILYANASSA,* nov. gen.

Type, I. OBSOLETA.

Nassa obsoleta; Say, Journal Academy Natural Sciences, Philadelphia, II, 1822, p. 232. *Buccinum obsoletum* Gould, Invert. Massachusetts, 1841, p. 308, f. 210.

Shell reticulated or decussated, rather thick and strong; spire elevated; inner lip smooth; callus moderate. Foot broad, without caudal bifurcation or cirri. Operculum† resembling somewhat that of *Buccinum*, obovate, broadest below; nucleus a little within the margin at the outer side near the base; margin entire, not serrated; lingual teeth (plate 9, fig. 11,) like those of *Nassa*. Ova-capsules (plate 9, fig.

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* Etym., ἰλὺς, *limus*; ἄνασσα, *regina*.

† The operculum is always herein considered in its natural position when retracted into the aperture of the shell.

12,) rounded, erect, slightly compressed, with the anterior and upper surface covered with facettes formed by reticulating ridges or crests, the angles of which are spinous.

It differs from *Nassa* and *Phos* in the form of the operculum and the want of caudal cirri on the foot. From *Northia* in the shape of the shell, as well as that of the operculum. The typical species is littoral in station, living on mud-flats in bays and harbors, and is found more abundantly than any other gasteropod on the Eastern coasts of the United States of North America.

Fam. CLIONELLIDÆ.

The genus *Clionella* of Gray,[*] founded on the *Buccinum sinuatum* of Born,=*Pleurotoma buccinoides* Lam,[†] will form the type of a new family. It has been supposed, from the color of the thick periostraca of the shell, to be a fresh-water genus, and is placed in the Melanopsinæ by recent authors. It is, however, as has been already pointed out,[‡] a marine form. We have had opportunities of observing the living animal in specimens dredged from a sandy bottom at the depth of two fathoms, in Simon's Bay, at the Cape of Good Hope, by the United States North Pacific Exploring Expedition. The soft parts do not accord with the figure of the type given in H. & A. Adams' "Genera," pl. xxii., f. 10.[§]

In our specimens the eyes are placed near the tips of the tentacles; the foot is short and very broad, projecting anteriorly but little beyond the head, and broadly rounded behind. The operculum is subelliptical, with the nucleus near the middle of the inner side,—resembling that of *Clavatula*, as figured by H. & A. Adams, and that of *Tomella*, as figured by Gray.[‖]

The lingual dentition is of a very peculiar type, differing from any yet described (plate 9, fig. 13.) The animal has a true lingual ribbon, with the teeth in three rows 1·1·1; the rhachidian tooth being very small and delicate, as in *Fasciolaria*, and armed with a single denticle; while the lateral teeth are very large, not versatile, and shaped somewhat like the canine teeth of Mammals, pointing obliquely inward and backward, and hollow at the root or base of attachment.

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[*] Proceedings Zoological Society, London, 1847, p. 153.

[†] See Kiener, Pleurot., p. 38; pl. xiii., f. 1.

[‡] American Journal of Science and Arts, [2] xxxviii., p. 48.

[§] This figure is said to be taken from the "Regne Animal" of Cuvier, Ed. 2d. May not some confusion have arisen between the ideas concerning the animal in question and the *Melanopsis buccinoidea*, in consequence of the similarity of specific names? We have not the "Regne Animal" at hand to refer to.

[‖] Guide, I., p. 7, fig. 4.

This dentition is in some degree intermediate in character between the Odontoglossata of Gray and the Toxoglossata; and indicates a new group of value equivalent to these, which may be called Tomoglossata. Probably all of the Clavatulinæ, or Pleurotomidæ with an operculum having the nucleus on the inner edge, will be found to belong to it,

The relations of the genus *Halia*, the anatomy and dentition of which are described by Fischer in the "Journal de Conchyliologie," vol. VII., 1858, p. 141, will probably be found to lie with this group, rather than with the Defranciinæ. That animal has a true lingual ribbon, with the lateral teeth similar in position to those of *Clionella*, though much more slender. No rhachidian teeth have been observed.

Fam. DENTALIIDÆ.

HELONYX, nov. gen.

Type, H. CLAVATUS.—pl. 9, f. 14.

Dentalium clavatum Gould, Otia, p. 119.

Shell small, subulate, polished, almost hyaline, arcuated, swollen before the middle, and contracted at the mouth; posteriorly attenuated, with the margin of the anal aperture entire. Foot greatly elongated, cylindrical, and obtuse at the extremity; collar apparently entire. Anal siphon longer than in *Dentalium*, not fissured.

This genus comprises certain small *Dentalia*, which, from the contraction at the anterior extremity of their shells, have been commonly supposed to belong to Annelides allied to *Ditrupa*. An examination of the living animal in the typical and only living species, *D. clavatum*, discovered by the writer in the harbor of Hong Kong, China, has shown it to be a Mollusk, very closely allied to *Dentalium*. This species lives on muddy bottoms, at depths of from six to twenty fathoms. It was of a pure waxen-white color when alive, except where the dark-brown rami of the liver showed through the shell.

The genus, which first appears in the Cretaceous, is represented by several species in the various formations deposited during the Tertiary epoch, when it seems to have reached its climax of development.

The following are some of the fossil species, for information regarding which I am chiefly indebted to Mr. Meek.

H. PUSILLUS. *Dentalium* (*Ditrupa ?*) *pusillum* Gabb., Palæontology of California, I., 1864, p. 139; pl. xxi., f. 99.—Cretaceous formation of California.

H. SUBCOARCTATUS. *Ditrupa subcoarctata* Gabb., Jour. Acad. Nat. Sciences, Philadelphia, [2] IV., 1860, p. 386; pl. lxvii., f. 47.—Eocene of Wheelock, Texas.

H. COARCTATUS. *Dentalium coarctatum* Lamarck, An. sans. Vert., 2d edition, v., 1838, p. 599.—Miocene of Peidmont.

H. THALLUS. *Dentalium thallus* Conrad, Miocene Foss., 1844, p. 78, pl. xliv., f. 5.—Miocene of Virginia.

REVISION OF M. PETIT'S CATALOGUE OF THE GENUS MONOCONDYLŒA, D'ORB.

BY CHARLES M. WHEATLEY, PHŒNIXVILLE, PA.

In Journal de Conchyliologie, 3d series, No. 1, January 1865, M. Petit de la Saussaye publishes "Note on the genus Monocondylœa, D'Orb., description of a new species (*M. Cambojensis,*) with catalogue of fifteen species." I propose the following revision of M. Petit's list :—

Asia.

M. Euphratica, Bourg.—River Euphrates, and Tigris River, near Bagdad.
  Unio Euphraticus, Bourg.—Test. Nov. p. 28, No. 4. 1852.
  Unio Euphraticus, Bourg.—Voy. de la mer morte, pl. 4, fig. 1–4. 1853.
  Unio Opperti, Bourg.—Amén. vol. 1., p. 54, pl. 14, fig. 6. and pl. 15, fig. 1. 1856.
  Unio Churchillianus, Bourg.—Amén. vol. ii., p. 35, pl. 2, fig. 1–4. 1857.
  Monocondylœa rhomboidea, Lea.—Pro. Acad. Nat. Sci., Phila., p. 187. 1859.
M. Michonii, Bourg.—Jaffa, Syria.
  Unio Michonii, Bourg.—Test. Nov., p. 27, No. 2. 1852.
  Unio Michonii, Bourg.—Voy. de la mer morte, pl. 3, fig. 10–12. 1853.
M. Tripolitana, Bourg.—Tripoli, Syria.
  Unio Tripolitanus, Bourg.—Test. Nov. p. 28, No. 3. 1852.
  Unio Tripolitanus, Bourg.—Voy. de la mer morte, pl. 4, fig. 10–12. 1853.
M. Saulcyi, Bourg.—Jaffa, Syria.
  Unio Saulcyi, Bourg.—Test. Nov. p. 27, No. 1. 1852.
  Unio Saulcyi, Bourg.—Voy. de la mer morte, pl. 3, fig. 1–3. 1853.
M. Wheatleyi, Lea.—River Tigris, near Mosul.
  Monocondylœa Wheatleyi, Lea.—Pro. Acad. Nat. Sci., Phila., p. 176. 1862.
  Monocondylœa Wheatleyi, Lea.—"Obs," vol. 10, p. 35, pl. 50, fig. 307.
M. Mardinensis Lea.—Tigris River, near Mardin.
  Monocondylœa Mardinensis, Lea. — Pro. Acad. Nat. Sci., Phila., Dec. 20, 1864.
M. Cumingii, Lea.—Malacca and Cambodia.

Anodonta Cumingii, Lea.—Pro. Zool. Soc. Lond., p. 199, 1850.

Monocondylæa Cumingii, Lea.—"Obs," vol. 7, p. 53, pl. 33, fig. 114.

M. MONHOTII, Lea. Streams in Laos Mountains, Cambodia.

Monocondylæa Monhotii, Lea.—Pro. Acad. Nat Sci., Phila., p. 190. 1863.

M. COMPRESSA, Lea.—Siam.

Monocondylæa compressa, Lea.—Pro. Acad. Nat. Sci., Phila., p· 190. 1863.

M. CAMBOJENSIS, Petit.—Cambodia.

Monocondylæa Cambojensis, Lea.—Jour. de Conchyliologie, pl. 4, fig. 4, Jan., 1865.

M. INOSCULARIS, Gould.—River Salwen.

Anodonta inoscularis, Gould.—Pro. Bost. Soc. Nat. Hist., vol. 1, p. 160. Dec., 1843.

M. CREBRISTRIATA, Anthony, M.S.—Pegu.

M. PEGUENSIS, Anthony, M.S.—Pegu.

South America.

M. PARAGUAYANA, Orb.—Parana and Rio Batel, Province Corrientes.

Monocondylæa Paraguayana, Orb.—Mag. Zool., p. 37, No. 1. 1835.

Monocondylæa Paraguayana, Orb.—Voy. Am. Merid., p. 612, pl. 70, fig. 5–7.

M. MINUANA, Orb.—Rosario, Uruguay.

Monocondylæa Minuana, Orb.—Mag. Zool., p. 37, No. 2. 1835.

Monocondylæa Minuana, Orb.—Voy. Am. Merid., p. 612, pl. 70, fig. 8–10.

M. PARCHAPPII, Orb.—Parana, near Itaty, Province Corrientes.

Monocondylæa Parchappii, Orb.—Mag. Zool., p. 38, No. 3. 1835.

Monocondylæa Parchappii. Orb.—Voy. Am. Merid., p. 612, pl. 68, fig. 1–3.

M. CORRIENTESENSIS, Orb.—Rio Batel, Province Corrientes.

Monocondylæa Corrientesensis, Orb.—Mag. Zool., p. 38, No. 4. 1835.

Monocondylæa Corrientesensis, Orb.—Voy. Am. Merid., p. 613, pl. 68, fig. 8–10.

M. GUARAYANA, Orb.—Rio San Miguel, Province Chiquitos, Boliva.

Monocondylæa Guarayana, Orb.—Mag. Zool., p. 38, No. 5. 1835.

Monocondylæa Guarayana, Orb.—Voy. Am. Merid., p. 614, pl. 68, fig. 4–7.

M. FOSSICULIFERA, Orb.—Rio Panana, at Iribucua.
Monocondylœa fossiculifera, Orb.—Mag. Zool., p. 38, No. 6. 1835.
Monocondylœa fossiculifera, Orb.—Voy. Am. Merid., p. 614, pl. 80, fig. 5–7.

M. TAMSIANA, Dunker.—Rivers in Mountain Valleys. Venezuela.
Monocondylœa Tamsiana, Dunker.—Malak. Blatt, p. 226. 1858.

M. FRANCISCANA, Moricand.—Brazil.
Monocondylœa Franciscana, Moric.—Jour. Nat. Hist. Soc.. Geneva, vol. 8, pl. 3, f. 14.

Oceanica.

M. VONDEMBUSCHIANA, Lea.—Java.
Monocondylœa Vondembuschiana, Lea.—Trans. Am. Philos. Soc., vol. 8, pl. 18, fig. 39. 1840.
Margaritana Zollingeri, Mousson.—Zeits. fur Malak., p. 185. 1849.
Margaritana crispata, Mousson.—Zeits. fur Malak., p. 185. 1849.
Margaritana fragilis, Mousson.—Zeits. fur. Malak, p. 185. 1849.

M. PLANULATA, Lea.—Java.
Monocondylœa planulata, Lea.—Pro. Acad. Nat. Sci., Phila., p. 187. 1859.
Monocondylœa planulata, Lea.—"Obs." vol. 7, p. 80, pl. 42. fig. 142.

Europe.

M. BONELLII, Fer.—France. Lake Gonda, Italy.
Alasmadonta Bonellii, Fer.—Rossm., p. 24, pl. 9, fig. 134.
Alasmadonta depressa, Villa.—Cat. Moll. Lombardia.
Alasmadonta compressa, Villa.—Cat. Moll. Lombardia.
Unio depressa, Pfr.—Pfeiff., p. 32, pl. 8, fig. 3–4.
Unio compressa, Menke.—Menke, Synop., p. 106. 1830.
Unio Bonellii, Menke.

Doubtful Species.

M. VIGNONANA, Bernardi.—Upper Gaboon, Africa.
Margaritana Vignonana, Bern.—Journal de Conchyliologie. vol. 3., 2d series, p. 302, pl. 10, fig. 1.

M. PFEIFFERIANA, Bernardi.—Upper Gaboon, Africa.
Margaritana Pfeifferiana, Bern.—Journal de Conchyliologie. vol. 4, 2d series, p. 331, pl. 12, fig. 1, 2.

M. GLAUCA ? Gould.—(Petit's Cat,) Oceanica.
Anodonta glauca, Gould.—Proc. Bost. Soc. Nat. Hist., vol. 3, p. 293. Nov., 1850.—Peru.

CATALOGUE OF MOLLUSCA, COLLECTED BY PROF. D. S. SHELDON, AT DAVENPORT, IOWA.

BY GEORGE W. TRYON, JR.

HELICIDÆ.

1. Hyalina arborea, Say.
2. " electrina, Gould.
3. " indentata, Say.
4. Mesomphix ligera, Say.
5. Gastrodonta lineata, Say.
6. Macrocyclis concava, Say.
7. Patula alternata, Say.
8. " perspectiva, Say.
9. " striatella, Anthony.
10. Stenotrema hirsuta, Say.
11. " monodon, Rackett.
12. Triodopsis tridentata, Say.
13. Mesodon albolabris, Say.
14. " clausa, Say.
15. " multilineata, Say.
16. " thyroides, Say.
17. " profunda, Say.
18. Vallonia pulchella, Müll.
19. Strobila labyrinthica, Say.
20. Leucochila contracta, Say.
21. Succinea obliqua, Say.
22. " ovalis, Gould.

LIMNÆIDÆ.

23. Limnæa stagnalis, Linn.

L. jugularis, Say.

24. Limnophysa palustris, Müll.

L. umbrosa, Say.

25. Limnophysa reflexa, Say.
26. " zebra, Tryon, Mss.
27. Physa gyrina, Say.
28. " heterostropha, Say.
29. Bulinus hypnorum, Linn.
30. Planorbella campanulatus, Say.
31. Helisoma bicarinatus, Say.
32. " regularis, Lea.
33. " trivolvis, Say.

34. MENETUS EXACUTUS, Say.
35. GYRAULUS DEFLECTUS, Say.
36. " PARVUS, Say.
37. PLANORBULA ARMIGERA, Say.
38. ANCYLUS RIVULARIS, Say.

STREPOMATIDÆ.

39. PLEUROCERA SUBULARE, Lea.
40. GONIOBASIS LIVESCENS, Menke.

VIVIPARIDÆ.

41. MELANTHO SUBSOLIDA. Anthony.
42. " INTEGRA, Say.
43. VIVIPARA INTERTEXTA, Say.
44. LIOPLAX SUBCARINATA, Say.

AMNICOLIDÆ.

45. SOMATOGYRA ISOGONA, Say.
46. " DEPRESSA, Tryon.
47. AMNICOLA CINCINNATIENSIS, Anthony.
48. " SAYANA, Anthony.
49. POMATIOPSIS LAPIDARIA, Say.

VALVATIDÆ.

50. VALVATA TRICARINATA, Say.

UNIONIDÆ.

51. ANODONTA CORPULENTA, Cooper.
52. " GRANDIS, Say.
53. " INBECILIS, Say.
54. " SUBCYLINDRACEA, Lea.
55. " UNDULATA, Say.
56. MARGARITANA COMPLANATA, Bar.
57. " HILDRETHIANA, Lea.
58. " MARGINATA, Say.
59. " RUGOSA, Bar.
60. UNIO AESOPUS, Green.
61. " ALATUS, Say.
62. " ANODONTOIDES, Lea.
63. " ASPERRIMUS, Lea.
64. " CAPAX, Green.
65. " CORNUTUS, Bar.
66. " CRASSIDENS, Lam.
67. " DISTANS, Anthony, Mss.
68. " DORFEUILLIANUS, Lea.
69. " EBENUS, Lea.
70. " ELEGANS, Lea.
71. " ELLIPSIS, Lea.
72. " FRAGOSUS, Conrad.

73. Unio gibbosus, Bar.
74. “ glans, Lea.
75. “ gracilis, Bar.
76. “ graniferus, Lea.
77. “ Higginsii, Lea.
78. “ iris, Lea.
79. “ ligamentinus, Lam.
80. “ luteolus, Lam.
81. “ metanevra, Raf.
82. “ monodontus, Say.
83. “ occidens, Lea.
84. “ orbiculatus, Hild.
85. “ parvus, Bar.
86. “ phaseolus, Hild.
87. “ plicatus, Lesueur.
88. “ pustulatus, Lea.
89. “ pustulosus, Lea.
90. “ pyramidatus, Lea.
91. “ rectus, Lam.
92. “ rubiginosus, Lea.
93. “ securis, Lea.
94. “ spathulatus, Lea.
95. “ tenuissimus, Lea.
96. “ triangularis, Bar.
97. “ trigonus, Lea.
98. “ tuberculatus, Bar.
99. “ undulatus, Bar.
100. “ ventricosus, Bar.
101. “ verrucosus, Bar.
102. “ zigzag, Lea.

NOTES.

The species appear to be very numerous, in individuals, at this locality. They are large and perfect in growth, exhibiting rich coloring; especially is this case with the *Unionidæ*, which frequently possess warm pink, or purple nacres, very iridescent, while the epidermis is bright yellow or green, polished and splendidly rayed. The beaks are frequently so perfect in old specimens as to exhibit the undulations plainly.

Among the species presented by the above catalogue, *Melantho subsolida*, Anth., may be distinguished for the great size and weight it attains, one specimen being nearly two inches long. *Vivipara intertexta* has not before been reported north of Louisiana.

Unio Higginsii and *Somatogyrus depressa* have not been, as yet, discovered, except in Iowa. *Unio distans*, Anth., and *Limnophysa zebra*, Tryon, will be described in our April No.

Editor's Table.

REVIEWS.

I. *AMERICAN.*

Transactions of the Nova Scotian Institute of Natural Sciences, of Halifax, N. S. Vol. ii.; part 1, 1864. 2s., 6d. per part.

Contributions to the Natural History of the Bermudas, part 1, *Mollusca*: BY J. M. JONES.

The catalogue embraces 120 species, among them *Succinea Texasiana*, Pfr., with the following remarks :—

"When the Mollusk inhabits the shell, the latter appears to be of a mottled, muddy green color, but when the Mollusk is removed, the shell assumes a light orange hue."*

Synopsis of the Fluviatile and Terrestrial Mollusca, of the State of Maine.

Double sheet. Published by the Author, 1863.

Observations on the Terrestrial Pulmonifera of Maine, including a Catalogue of all the species of Terrestrial and Fluviatile Mollusca, known to inhabit the State: BY ED. S. MORSE, 8vo., 63 pp., with numerous wood cuts and several plates.

Reprinted from the Journal of the Portland Society of Natural History, Portland, Maine, 1864.

We feel that we are but rendering justice to Mr. Morse, in saying that never before have such important results of minute and patient study appeared in any American volume on Conchology, of the small dimensions of the one before us.

This work is a substantial advance in conchological science, and should stimulate us all to renewed, painstaking researches, even upon the species which have been supposed to be well known to us.

Mr. Morse being an artist as well as a Conchologist, has depicted, not only the shells of many of the species, but in most cases has illustrated their buccal plates, and frequently their lingual dentition.

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* We very much doubt if *Suc. Texasiana* inhabits the Bermudas. Probably some other species is alluded to.

Mr. Morse commences his paper by stating that since the publication of Mighels' Catalogue, the number of terrestrial and fluviatile mollusca, known to inhabit the State, has nearly doubled. In studying them, he has been continually on his guard not to rely too much on a single feature, but to consider impartially all parts together. The interpretation of the natural subdivisions which exist in these animals, will require a deeper and more philosophical method of study, embracing their complete embryology and anatomy, "and then whatever may be revealed by such work, will, I believe, be as characteristically stamped on the shell as on the habits and economy of the animal."

In the *Helicidæ*, Mr. Morse detects three different types of lingual dentition, and remarks that the three sub-families founded on them, are alike distinguishable, from the "character of the shell; the external appearance of the animal, and the general size of the species."

"Taking the number of lingual plates in a row, from five different species in each group from *Pupinæ* upwards, and averaging this number for each group, we have the following result:—

LIMACIDÆ, including PHILOMYCENIDÆ, 94.
HELICINÆ, 73.
HELICELLINÆ, 42.
VALLONINÆ, 26.
PUPINÆ, 24."

Tebennophorus dorsalis, Binney, is made a new genus *Pallifera*, characterised by arcuate buccal plate with seven prominent ribs, crenulating its cutting edge. Central plate of tongue tridentate, laterals bidentate, uncini denticulated.

Sub-family *Helicinæ* embraces the large species, such as *albolabris, Sayii,* &c.

Anguispira is proposed as a generic name for *H. alternata*, Say.

Helicellinæ embraces the thin diaphanous Helices like *cellaria electrina*, &c.; with these is described a new species, *H. Binneyana,* Morse. Differs from *electrina* in color, being nearly white, with a greenish tinge, and is one-third smaller.

H. exigua and *H. minuscula* form the new genus *Pseudohyalina*. "In *Hyalina* the laterals comprise one-sixth or one-seventh of the whole number of plates in a row, while in *Pseudohyalina* the laterals comprise about one-third the number. In *Hyalina* the shell is smooth and polished; in this the shells are either ribbed or striated." The buccal plate also differs in form.

Striatura ferrea is the type of a new genus and species, the former "based upon peculiarities of dentition, as seen in the enormous central plate and the channelled buccal lamina."

Mr. Morse separates *H. chersina* from *H. fulva*, *H. minuta*, Say, from *H. pulchella*, *Zua lubricoidea*, Stimp., from *Z. lubrica*. But we think his reasons, though suggestive, are not conclusive.

For *H. minutissima*, Lea, Mr. Morse makes the genus *Punctum* and the sub-family *Punctinæ*, based on "the peculiar conformation of the buccal plate, divided by sixteen distinct pieces, and the character of the lingual dentition, corresponding closely with *Carychium exiguum*."

A full description and embryology of the much vexed *Helix harpa*, Say, is given; it is made a genus, *Zoögenetes* in the subfamily *Pupinæ*.

Limnea decollata, Mighels, Mr. Morse believes to be identical with *L. catascopium*, an opinion which we cannot share with him. *L. ampla* is shown to be very rare and probably local. "Found a few dead specimens in Mud Lake, at the northern part of the State, the original place of discovery."

Physa heterostropha deprived of air by being placed in a small vial filled with water, survived the deprivation seventeen hours. *Limnea desidiosa*, under like circumstances lived about seven hours.

Ancylus ovalis and *A. borealis*, two new species, are described and figured.

Mr. Morse enumerates in all, 49 land and 55 fresh water shells, total 104 species, which is actually a larger number than inhabits Ireland, a somewhat larger country, and much larger proportionally than England. In the last two countries the terrestrial forms predominate, so as to make three-fifths of the species, while in Maine more than half are fluviatile.

The remarks on the abundance or rarity of certain species as compared with the data given by Dr. Mighels in his Catalogue published twenty years ago, does not appear to us to serve any useful purpose, except to suggest that such remarks applied to species as "very abundant," "rare," &c., ought to be received with great distrust.

The text to this volume is followed by 10 plates, principally devoted to dentition. One of them exhibits magnified views of the surfaces of several small Helices.

This work may be obtained of the author for $1.50, we believe, a price that will never repay him for the laborious production of the magnified figures which adorn it.

Check List of the Invertebrate Fossils of North America, Miocene: BY. F. B. MEEK, **(Smithsonian Miscellaneous Collections, Nov. 1864.)**

An exceedingly useful index to our Miocene Mollusca. Prof. Meek has enumerated over 700 species. American Palæontologists may congratulate themselves upon the possession of such thorough catalogues of species as those published by Dr. Meek, Mr. Conrad and Mr. Gabb.

We do not agree with Dr. Meek in rejecting pre-Linnæan generic names.

Proceedings Academy Natural Sciences, Philadelphia, No. 1., January and February, 1864.

Description of a new Genus of the Family Melanidæ. BY ISAAC LEA.

Meseschiza Grosvenorii, Wabash River, Indiana.

We have examined the specimens of this shell. They do not appear to us to be mature. The pleurotomose slit in the outer lip on the periphery, is a curious feature.

Descriptions of eleven new species of Indigenous Melanidæ: BY ISAAC LEA.

Goniobasis Emeryensis, Rocky Creek, East Tenn.
" *umbonata,* Cumberland River.
" *Albanyensis*, Baker Co., Georgia.
" *viridostriatus,* Flint River, Georgia.
Trypanostoma subrobustum, Holston River.
" *Roanense*, Roane Co., East Tenn.
" *Lesleyi,* E. Tenn., Pulaski Co., Ky.
" *affine,* Cumberland River.
" *cylindraceum*, Roane Co., E. Tenn.
" *carinatum,* Bull Run, East Tenn.
Strephobasis Lyonii, Holston River.

In this paper Mr. Lea proposes the genus *Eurycælon* for a small group of species having a large ear-shaped aperture, the columella with a callus above and truncate below; the whorls noduled. To this group pertain *G. umbonata, midas, and Anthonyi, Anc. turbinata, crassa,* and some few other species. Having described two new species of *Goniobasis* in 1861 under the names of *blanda* and *Vanuxemii,* both of which were pre-occupied by himself for species originally described as *Melanians* but which now prove to be *Goniobases,* Mr. Lea proposes to change their names to *versa* and *Prestoniana* respectively. *Goniobasis Canbyi,* Lea, having been previously described by Mr. Reeve as *G. Etowahensis,* Lea, the name of *Canbyi* is transferred to the shell which Mr. Lea subsequently described as *Etowahensis.*

Description of, and Remarks on, Planorbis Newberryi: BY ISAAC LEA.

For this species a new genus is proposed, *Megasystropha*; Mr. Binney's name *Carinifex,* however, has priority.

Synonymy of the species of Strepomatidæ, a family of Fulviatile Mollusca, inhabiting North America. Part 2d: BY GEORGE W. TRYON, JR.

This part is occupied by the genus *Goniobasis* entire, except a group of about sixty species from Alabama, which form the subject of part 4th, just read to the Academy.

A synonymy of the genus shows no less than ten synonymic names.

The species, numbering 216 adopted names and 113 synonyms are divided into the following groups:—

a. *Shell spirally ridged,*
b. " *tuberculate,*
c. " *plicate,*
d. " *angulate,*
e. " *carinate,*
f. *Shell bi-multi-angulate,*
g. " *clavate, smooth,*
h. " *elevated, smooth.*
i. " " *striate.*

No. 2, March and April, 1864.

Synonymy of the family Strepomatidæ, &c. Part. 3d: BY GEORGE W. TRYON, JR.

This part embraces:—

Schizostoma 26 species and 17 synonyms.
Anculosa, 33 " " 40 "

Descriptions of six new species of Unionidæ, from Lake Nyassa, Central Africa: BY ISAAC LEA.

Unio Kirkii,
" *Nyassaensis,*
" *Aferula,*
Spatha alata,
" *Nyassaensis,*
" *modesta.*

Descriptions of six new species of Succinea of the United States: BY ISAAC LEA.

Succinea Haleana, Alexandria, Louisiana.
" *Grosvenori,* Alexandria, Louisiana.
and Santa Rita Valley, Kansas.
" *Mooresiana,* Platte River.
" *Wilsonii,* Darien River.
" *Forsheyi,* Rutersville, Texas.
" *pellucida,* United States.

Mr. Lea publishes a reclamation of his former species of *Succinea,* eight in number. We certainly are disposed to admit the validity, of not only those species conceded by Messrs. Gould & W. G. Binney to be good ones, but also most decidedly, that of *S. inflata.* With *S. retusa* and *S. Wardiana* we are not autoptically acquainted.

Description of a new Species of Planorbis: BY ISAAC LEA.

Pl. Billingsii, Ottawa River, Canada West.

Description of thirteen new Species of Melanidæ of the United States: BY ISAAC LEA.

Goniobasis subrhombica, Hog Co., N. Georgia.
" *fraterna*, Cahawba River, Alabama.
" *Romæ*, Rome, N. Georgia.
" *quadricincta*, Coosa River, Ala., E. Tennessee, N. Georgia, &c.
" *Smithsoniana*, N. Geor., & East Tenn.
" *pulla*, Cumberland Gap, East Tenn.
" *pupaeformis*, Coosa River, Alabama.
Trypanostoma venustum, Big Prairie Creek, Ala.
" *cinctum*, North Alabama.
" *univittatum*, Cahawba Riv., Ala.
" *corneum*, Tennessee.
" *napoideum*, Tennessee.
Schizostoma Showalterii, Coosa River, Alabama.

We fear that this last name, as proposed, ought not to stand. Mr. Lea used it once before for a shell which proved to have been previously described by Mr. Anthony as *Sch. carniferum*. If we now admit the name, naturalists will always be at a loss to understand which species is referred to by it. We suggest the propriety of recognizing the one now described as *Showalteriana*, which perhaps may present sufficient difference, and still remain as it was intended to be, a compliment to the assiduous naturalist who has so greatly enriched our collections with new southern species.

Description of five new species of Lymnæa of North America: BY ISAAC LEA.

L. Smithsoniana, Loup Fork, Platte River.
L. Traskii, San Antonio Arroya.
L. Jamesii, Ohio, Georgia.
L. Lecontii, Georgia.
L. Arctica, Moose River, B. A.

As *Limnea Traskii*, Tryon, was published in 1863, Mr. Lea will have to find another name for his species.

Descriptions of two new species of Unionidæ of South Africa: BY ISAAC LEA.

Spatha Natalensis, *Unio Natalensis*.

Descriptions of twenty-four new species of Physa of the United States and Canada: BY ISAAC LEA.

P. Niagarensis, Niagara.
P. Altonensis, Illinois.
P. crocata, Lafayette, Georgia.
P. Forsheyi, Rutersville, Tex.
P. tenuissima, Alexandria, La.
P. Halei, Alexandria, La.,
P. Showalterii, Uniontown, Ala.
P. Smithsoniana, Loup Fork, Platte River.
P. Warreniana, Loup Fork, Milwaukee, Grand Rapids, Mich.

P. Febigerii, Logan Co., Ohio.
P. Nicklinii, Allegany Co. Va.
P. Grosvenorii, Santa Rita Valley, Kansas.
P. Whitei, Georgia, Kansas.
P. Saffordii, Tenn., Kansas.
P. Hawnii, Verdigris River.
P. anatina, Kansas.
P. parva, Kansas.
P. Traskii, California.
P. striata, California.
P. Blandii, California.
P. Nuttallii, Oregon.
P. venusta, Oregon.
P. hordacea, Oregon.
P. brevispira, Ottowa River, Canada West.

No. 3. June, 1864.

Melantho, Bowdich = *Campeloma*, Raf., vide Theodore Gill, verbal communication. Probably so, but by no means so certainly, as to authorize the substitution of Rafinesque's name for that of Bowdich.

Descriptions of new species of Marine Invertebrata from Puget Sound: BY WM. STIMPSON, M. D.

Cynthia Gibbsii.
" *coriacea.*
Cynthia villosa.
Chelysoma producta.

No. 4, September, 1864.

Notes on Shells, with descriptions of new Fossil Genera and Species: BY T. A. CONRAD.

Turitella præcincta, Eocene, Alabama.
Protocardia Virginiana Eocene Pamunkey Riv., Va.
Fasciolaria subtenta, North Carolina.
Lirisoma curvirostra, North Carolina.
Ericinella ovalis
Cyprimeria, new genus of *Cyprinidæ*.
C. excavata, Morton, Cretaceous, N. J., with figure.
Dosiniopsis, n. g.
D. Meekii, Eocene, Washington, D. C.

Mr. Conrad remarks that *Noetia (Arca) ponderosa*, Say, occurs abundantly in the Post-Pliocene of the Southern States, and lives on the southern coast of Florida. To this we would add that fossil valves are not at all uncommon both at Cape May and Atlantic City, N. J. At the former locality Mr. Say's fossil *Turitella plebeia* also occurs on the beach.

American Journal of Science and Arts, No. 110, March, 1864.

Remarks on the family Pteriidæ = Aviculidæ, with descriptions of some new fossil genera: BY F. B. MEEK.

Three sub-families are proposed:—

PTERINÆ, (*Pterinia* group.)

Genera, *Pterinia, Myalina, Ambonychia, Actinodesma Gryphorhynchus*, n. g.,

PTERIIÆ (or *Aviculinæ*.)

Genera *Pteroperna*, *Pteria*, or (*Avicula*,)

Margaritifera, Malleus, Aucella, Eumicrotis, (n. g.,)
and probably the extinct genera,
Monotis, Halobia, Pteronites, Posidonomya,
MELININÆ, (*Perna or Isognomon* group.)
Genera *Crenatula, Melina=Perna,* (Brug.,
not Adanson,) *Bakevellia, Gervillia,*
Inoceramus, Pulvinites.

Notice of a small collection of Fossils from the Potsdam Sandstone of Wisconsin, and Lake Superior Sandstone of Michigan: BY PROF. ALEXANDER WINCHELL.

The new shells are:—

Orthis Barabuensis.
Straparollus primordialis.
Pleurotomaria advena.

No. 111, May, 1864.

On the Cretaceous and Superior Formations of West Tennessee: BY J. M. SAFFORD.

Lists of species of shells occuring in the various formations are given, and the following recent species are mentioned as occuring fossil in the Bluff Loam, (Post-Tertiary.)

Helices *appressa, hirsuta, monodon, solitaria profunda; Planorbis bicarinatus, Amnicola lapidaria,* and species of *Lymnea.* and *Cyclas.*

No. 112, May, 1864.

On the structural characters of the so-called Melanians of North America. BY WM. STIMPSON, M. D.

A most excellent paper, containing a detailed account of the results of anatomical investigations of the soft parts of *Anculosa dissimilis* and *Goniobasis Virginica.* Dr. Stimpson also examined *Io. fluvialis,* but does not find any structural differences in either of these species to warrant the separation of the *Melanians* into genera; at the same time he agrees with Mr. Lea and others as to the propriety of separating these genera. The most important facts developed, are that the sexes are distinct in the *Strepomatidæ,* and that our species are oviparous, while the Oriental *Melanians* are ovo-viviparous. Dr. Stimpson states that the differences in the animals of *Trypanostoma* and *Goniobasis,* as described by Dr. James Lewis, (Pro. Acad., Feb., 1863,) are only sexual differences.

We are not surprised that the real differences in the animals of our various genera of *Strepomatidæ* have not yet been detected. The failure to do so, only shows that as a means of distinguishing genera, Conchology is still far in advance of Malacology. No one will presume to question the validity of these genera, founded on the shell alone, or that corresponding differences *must* exist in the animals, although we have so far failed to detect them.

No. 113, September, 1864.

Description of a new species of Chiton. BY WILLIAM PRESCOTT, M. D.

C. Californicus.=*Cryptochiton Stelleri*, Middend., according to No. 114, p. 431, November, 1864.

Had not this proved to be a synonym, the specific name is still preoccupied for another species.

Proceedings, Boston Society of Natural History, vol ix., December, 1863.

On the genus Gundlachia: BY WM. STIMPSON, M. D.

G. Meekiana, District of Columbia.

This makes the sixth species of the genus. Three have been described from Cuba, one from Honduras and one from California.

Proceedings, California Academy of Natural Sciences, San Francisco, vol. ii., 1864.

Descriptions of nine new species of Helix inhabiting California: BY WESLEY NEWCOMB, M. D.

Helix Hildebrandi,
" *Tryoni*,
" *crebristriata*,
" *rufocincta*,
" *Gabbii*,
Helix facta,
" *Whitneyi*,
" *Breweri*,
" *Duranti*.

Most of these are island species. *Tryonii* and *facta*, diverge widely from the ordinary Californian forms, resembling very much certain West Indian types. Indeed, *H. Tryonii* instantly reminds one of *H. alauda*, of Cuba, and its allies.

The following additional species are contained in the State collection:—

H. arrosa, Gld., *H. Californiensis*, Lea, *H. Carpenteri*, Newc., *H. Columbiana*, Lea, *H. chersina*, Say, *H. Dupetithouarsi*, Desh., *H. exarata*, Pfr., *H. fidelis*, Gray, *H. infumata*, Gld., *H. Kellettii*, Forbes, *H. loricata*, Gld., *H. Newberryana*, W. G. B., *H. Nickliniana*, Lea, *H. Mormonum*, Pfr., *H. sportella*, Gld., *H. Traskii*, Newc., *H. tudiculata*, Binney, *H. Vancouverensis*, Lea.

Description of a new Species of Pedicularia: BY WESLEY NEWCOMB, M. D.

P. Californica.

Complete Writings of Constantine Smaltz Rafinesque on Recent and Fossil Conchology. EDITED BY WM. G. BINNEY, AND GEORGE W. TRYON, JR.*

The papers contained in the work above quoted, form most valuable contributions to American Conchology, and include the Author's papers in this department of Science to eleven different works, with dates of publication ranging from 1714 to 1840,

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*Octavo, 104 pp., and plates, 1864. Published by Bailliere Bros., New York and H. Bailliere, London. Price, $2.50.

Besides numerous genera and species of marine and of fossil mollusca, nearly two hundred new species of American land and fresh water shells are described; of which many have been identified and adopted by the distinguished naturalists who have studied his works, notwithstanding the difficulty with his which inadequate descriptions and rude figures have surrounded them.

Unfortunately, Rafinesque's personal character together with the very few and confusedly named specimens which he distributed, have prevented these identifications from being so numerous or so complete, as in the case of Linnæus, Lamarck and others, whose descriptions are in many cases even less definite, but who surrounded themselves with scientific friends, and bequeathed to prosterity rich and authentic collections of shells.

A close study of Rafinesque's generic and specific descriptions has convinced us that he was possessed of a genius for the subject, very far in advance of the age in which he lived: and that under more favorable auspices, his works would have been quoted long ago, as those of a worthy pioneer in American Conchology.

In this edition of Rafinesque we have the original paging of the various papers preserved in brackets, while the text is an exact reprint, all the typographical and etymological errors being retained, in preference to making alterations which in some cases might not be acceptable to the student.

The work has additional attractions in the very copious index, occupying seven pages of double columns, small type, with reference to every genus, sub-genus, species or variety mentioned.

A brief notice of some of the American genera and species described by Rafinesque may not be considered unacceptable, and we offer no apology for rehearsing a subject which has puzzled older and abler Cohchologists, except that we believe that each fresh mind brought to the investigation of difficult questions, will evoke *some* new truths which his predecessors have failed to perceive. We are besides, in many cases, merely summing together and deducing results from the heretofore undigested studies of a number of Naturalists.

Of the genera of *Helicidæ,* described by Rafinesque, the following have been retained:—

Mesomphix, 1819 (p. 27,*)—Embracing such species as *H. fuliginosa, inornata, demissa*, &c., together with many European species. Characterized by a diaphanous texture, unreflected lip, and large umbilical opening.

Stenotrema, 1819 (p. 28.)—With a thick lip, emarginate, and a second lip or callus on the body whorl, uniting with the outer lip.—Ex. *H. hirsuta*, Say, and allied forms.

Triodopsis, 1819 (p. 28.)—proposed for the tridentate species of which *H. tridentata,* Say, may be considered the type.

Mesodon, 1831 (p. 67.)—"Differ from *Helix* by lower lip with a tooth," referring to the species of the *albolabris* group, all of which exhibit this character in greater or less distinctness.

The following genera have not been adopted:—

Odotropis, 1819 (p. 27.)—Shell with a tooth on the columella, lip reflected and covering the umbilicus. This genus was instituted for such shells as *H. albolabris, H. exoleta,* etc., but the characters are not in all cases of even specific value, and the species have very properly been included in *Mesodon.*

Xolotrema, 1819 (p. 27.)—Differs from *Triodopsis* by having a covered umbilicus, and the *inferior tooth lamelliform.* This genus, intended to embrace *H. palliata, H. obstricta, H. appressa*, &c., has been considered synonymous with *Triodopsis.* We think, however, that the group of shells included by its characters are sufficiently distinct to retain the name imposed by Rafinesque, and have so separated them in our Cabinet.

Chimotrema, 1819 (p. 28.)—With a transverse covered aperture, resembling a simple fissure.

Toxotrema, 1819 (p. 28.)—Differs from the preceding genus by an emarginate lip. Both these genera are referable to *Stenotrema,* Raf.

Aplodon, 1819 (p. 28.)—Umbilicated, aperture rounded, columella toothed. This genus is a synonym of *Mesodon*, and would include such species as *H. thyroides.*

Omphalina, 1831 (p. 67.)—"Differ from *Helix* by no lips, but an ombilic." Appears to be the same as *Mesomphix.*

Trophodon and Odomphium, 1831 (p. 67,) are both forms of *Mesodon.*†

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* The pages referred to in parenthesis are those of the reprint, and not of the original papers.

NOTE ON THE CLASSIFICATION OF CERTAIN AMERICAN HELICES.

† Such shells as *H. inflecta* and *H. personata* of Europe, referred by Pfeiffer (Mal. Blatt., 1855,) to *Isognomostoma*, Fitz., 1833, and included by Albers in the genus *Ulostoma*, do not appear to me to differ from *Triodopsis*, Raf., as the covered umbilicus is scarcely of specific value. I therefore include them in the latter genus, which has priority.

H. Rugeli, Shutt, also belongs here.

Helix elevata, placed by Pfeiffer in *Mesodon* and by Albers in *Triodopsis* belongs together with *H. Clarkii*, Lea, in the genus *Xolotrema*, Raf.

H. profunda, placed by Pfeiffer in *Ulostoma*, together with the species of *Triodopsis,* is really a *Mesodon* as Albers has correctly considered it.

Rafinesque describes the following *Helices*:—

Aplodon nodosum, 1819, (p. 28.)—Not identified.
Toxostoma globularis, 1831, (p. 47.)—Not identified.
Mesodon maculatum, 1831, (p. 67.)—Not identified.
Omphalina cuprea, 1831, (p. 68.)—Is possibly *H. fulginosa*.
Xolotrema clausa, 1831, (p. 68.)=*H. inflecta*, Say, identity first established by W. G. Binney.
Triodopsis lunula, 1831, (p. 68.)—I agree also with W. G. Binney in considering this a synonym of *H. indentata*, Say.

Mr. Rafinesque also described several species of naked snails, none of which can be identified:—

Agatina variegata, (p. 68,)=*Achatina fasciata*, (var. *picta* Rve?)
Agatina fuscata, (p. 68,)=same.

Various land shells from Buenos Ayres, (p. 93,) we cannot identify; but the five new species of fresh water shells from Bengal and Assam, described on the same page, are easily recognizable, but cannot be adopted, other names having priority.

Among the univalve fresh water shells of the United States, described by Rafinesque, the following appear to us to be worthy of recognition:—

Pleurocera. This we have adopted instead of *Ceriphasia*, Sw., and *Trypanostoma*, Lea, for species of *Strepomatidæ* belonging to the group of *Melania canaliculata*, Say. Of the several species described, *P. verrucosa* alone can be recognized; it is the same as *Melania nupera*, Say.

Ambloxis is the same as *Melantho*, Bowditch, as we have ascertained by the figures of two of the species in Rafinesque's manuscript "Conchologia Ohiensis," but it is questionable whether the published description is sufficiently explicit to warrant its adoption:—does it not equally refer to *Anculosa?*

Ellipstoma (p. 23 and 27) appears to us to be also referable probably to *Anculosa*.

Oxytrema (p. 26) is a *Melanian*, and would perhaps answer well to the heavy pupæform *Goniobases* of North Alabama.

Campeloma. Prof. Gill says this=*Melantho*, and that the species described (*C. crassula*,)=*Paludina heterostropha*, Kirtland. The description does not seem to us to warrant this reference any more than it would to a *Physa*.

Omphiscola, (p. 26.) This name may be applied pretty certainly to the group of Limnæans represented by *L. umbilicata*, Ads., *L. Adelinæ*, Tryon, &c.

Leptoxis (p. 26) has been adopted by Haldeman, H. & A. Adams, Chenu, and many other naturalists, instead of *Anculosa*, Say. There is positively no excuse for this. The description does not indicate the *Anculosæ* so well as several other of Rafinesque's genera. Either *Ambloxis* or *Ellipstoma* are better descriptions of this group. The fact is, Prof. Haldeman has adopted *Leptoxis*, published 1819, and unrecognizable, but identified by figures in the manuscript work lately belonging to Prof. H., but presented by him to the Smithsonian Institution. Such authority cannot be received, even for the purpose of elucidating published descriptions, provided good descriptions of the same object have since been published by other authors.*

The genus *Strepoma*, Raf., applied by Prof. Haldeman to the American Melanians, exists only in manuscript.

Cyclemis (p. 26) is perhaps equivalent to *Somatogyrus*, Gill. and *Omphemis* (p. 26) to *Pomatiopsis*, Tryon.

Lomastoma (p. 26) and *Eutrema* (p. 27) we cannot identify.

Mr. Prime has studied the Cyclades described by Rafinesque, with partial success.

With regard to the *Unionidæ* the difficulties surrounding the task of identifying his descriptions, are almost insurmountable, although they are not bad for the period; indeed, taking together, as he directs us, the generic and specific descriptions, a very fair idea of the general appearance of the species may be formed. The difficulty lies in the vast multitude of species which have been discovered since Rafinesque's time, naturally rending his descriptions those of groups rather than of species. In the following *resumé* of identifications by American naturalists, the species, when, supposed to possess priority, are printed in small caps; otherwise, in italics.

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* We would even reject names accompanied by those short unmeaning Latin diagnoses, without giving distinctive characters or size of specimen, which authors are in the habit of publishing in the Proceedings of various Societies, if the same species is subsequently *figured* or *fully described* by other naturalists. The abuse which has arisen from the claims of priority based on these unrecognizable descriptions is certainly beyond endurance, and no author ought to be permitted to impose upon the scientific world a species characterized by half a dozen lines of conventional, mongrel Latin, that would apply to several related species equally well as to the one described. A positively recognizable description, or details of differences, or a figure of the species should be rigidly required.

We recently had occasion to study a group, the species of which possess great similarity in all their character and are considered peculiarly difficult to determine. In looking for recent descriptions we found a number of Latin diagnoses, almost any one of which would suit any species we had before us; now is it reasonable that if we publish our new species in a satisfactory manner, that the author of these "diagnoses" shall say—"your species are synonyms, *this* is my so and so, published so many months or years in advance of you." How do we *know* that it *is* his *so and so?* Are we to take his word for it? *Then* we might as well dispense with his published description altogether, save him the trouble of stringing together a dozen or so of the few hundred words which comprise Conchology Latin, and above all, save ourselves the labor vainly expended in striving to comprehend it!

We have very carefully studied the species of *Unio*, described by Rafinesque, and find that the *descriptions* and *figures* will not authorize the identifications attempted by some of our conchologists. As mere *surmises*, they are probably correct, but there are by no means sufficient grounds for the *adoption* of his names. In our opinion, Mr. Lea, in his "Synopsis," has allowed to Rafinesque even more species than he is entitled to:—we can only identify *metanevra*, as a species entitled to priority, although two synonyms of Lamarck's species can be recognized easily.

We will not review Rafinesque's marine genera and species; a number of them have been universally adopted.

We perceive throughout these papers the evidence of our author's extraordinary genius for classification, and, we may add, for description also, and yet are continually made aware of his ill-balanced mind, his carelessness and haste, his poverty, and his pride.

Several passages like the following, occur:—

"Since 1820, several American Conchologists have attempted to notice, describe, or figure these shells; Barnes, in 1823, Lea, Say, and Eaton, later still. They had a fine field before them, in elucidating them by good figures, and describing the new kinds, but led astray, by various motives, they have neglected to verify, or properly notice my previous labors, *although they were known to them*. Mr. Say is, above all, inexcusable. I had respectfully noticed, in 1820, his previous labors; but he has never mentioned mine, and knows so little of the animals of these shells, as to have mistaken their mouth for their tail, and their anterior for the posterior part of the shells!

If he had seen these animals alive, feeding, moving, and watched their habits as I have done repeatedly, he would not have fallen into such a blunder. The mouth is always near the cardinal tooth, and the lamellar tooth is to the right of it in the right valve, to the left in the left valve.—Others pretend that my monograph is too intricate; it is the subject which is such; whenever many species belong to a tribe, many divisions and sections are needed to elucidate and isolate the species. All the great naturalists know and do this.

The works wherein their erroneous labors are found cost above $100! (mine only 50 cents.) This has put it out of my power, as yet, to verify all their mistaken and synonymous names.

The volume we have reviewed, is worthy of attentive study, and should have a place in the library of every student of the Sciences of Conchology and Palæontology.

ELLIPTIO
"
"
LEPTODE
"
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AXIMEDIA
EURYNIA
"
"
LAMPSILI
"
METAPTE
TRUNCILI
"
PLAGIOLA
ELLIPSAR
QUADRUL
ROTUNDAI
SCALENAR
SINTOXIA
"
PLEUROBI
"
AMBLEMA
"
"
"
"
ELLIPTIO
OBLIQUAR
TOXOLASM
ANODONT
ALASMIDO

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*I have not
bases his ide
descriptions o
† Only thos
‡ *U. cuneat*
‖ *U. carina*
§ Notwithst
satisfactorily

RAFINESQUE.*	LEA. Synopsis.	CONRAD. Synopsis.	CONRAD. Monograph.	SAY. Synonymy.	JAY. Catalogue.
ELLIPTIO NIGRA, p. 37,†	? CRASSIDENS.	*incrassatus.*	*crassidens.*	Adopted.‡	*crassidens.*
“ VIRIDIS, p. 39,		*Tappanianus.*§	Adopted.	CARIOSUS.	
“ FASCIATA, p. 40,			“	Adopted.‖	*Carinatus*, Bar.
LEPTODEA (ELLIPTIO) LEPTODON, p. 40,		*tenuissimus*, Lea.	*tenuissimus*, Lea.	*tenuissimus*, Lea.	*tenuissimus*, Lea.
“ “ FRAGILIS, p. 41,		*gracilis*, Bar.	*gracilis*, Bar.	*gracilis*, Bar.	*gracilis*, Bar.
“ “ NERVOSA, p. 41,		*zigzag*, Lea.		*zigzag*, Lea.	
AXIMEDIA “ LÆVIGATA, p. 42,		*donaciformis*, Lea. *lens*, Lea.		*donaciformis*, Lea. *castaneus*, Lea ?	
EURYNIA “ DILATATA, p. 42,	?GIBBOSUS, Bar.	*gibbosus*, Bar.	*gibbosus*, Bar.	*gibbosus*, Bar.	*gibbosus*, Bar.
“ “ LATISSIMA, p. 42,		RECTUS.	RECTUS.	RECTUS.	RECTUS.
“ “ SOLENOIDES, p. 43,		CYLINDRICUS,		CYLINDRICUS.	
LAMPSILIS CARDIUM, p. 43,		*ventricosus*, Bar.		*ventricosus*, Bar.	*ventricosus.* *occidens.* *subovatus,*
“ FASCIOLA, p. 44,	? MULTIRADIATUS.	*subangulatus.*	*multiradiatus.*	*multiradiatus.*	*multiradiatus.*
METAPTERA MEGAPTERA, p. 44,		ALATUS, Say.	ALATUS, Say.	ALATUS, Say.	
TRUNCILLA TRIQUETER, p. 45,		*triangularis*, Bar.		*triangularis*, Bar.	
“ TRUNCATA, p. 46,		*elegans*, Lea.		*elegans*, Lea.	
PLAGIOLA (OBLIQUARIA) DECORTICATA, p. 46.		ROTUNDATUS, Lam.			
“ INTERRUPTA, p. 47,		*brevidens*. Lea.	*brevidens*, Lea.	*brevidens*, Lea.	*brevidens*, Lea.
“ DEPRESSA, p. 47,	?SECURIS.	*lineolata*, Raf.		*lineolata*, Raf.	*lineolata*, Raf.
“ LINEOLATA, p. 47,		*securis*, Lea.		*securis*, Lea.	
ELLIPSARIA “ ELLIPSARIA, p. 48,				*crassus*, Say.	CRASSUS, Say.
“ FASCIOLARIS, p. 48,		*phaseolus*, Hild.		*phaseolus*, Hild.	*phaseolus*, Hild.
“ VERRUCOSA, p. 48,		*tuberculatus*, Bar.		*tuberculatus*, Bar.	
“ CUPREA, p. 48,		DILATATA, Raf.			
“ ATTENUATA, p. 49,	? NASUTUS.				
QUADRULA “ FLAVA, p. 49,		*rubiginosus*. Lea.	*rubiginosus.*	*rubiginosus.*	*rubiginosus.*
“ CYPHIA, p. 49,		*æsopus.*		*æsopus.*	*æsopus.*
“ METANEVRA, p. 50,	Adopted.	Adopted.	Adopted.	Adopted.	Adopted.
“ REFLEXA, p. 50,	CORNUTUS.	*cornutus.*	*cornutus.*	*cornutus.*	*cornutus*
“ RETUSA, p. 50,				*stapes*, var. ?	
“ FLEXUOSA, p. 50,	? FOLIATUS, Hild.	*foliatus.*	*foliatus.*	*pileus*, Lea.	*foliatus.*
“ NODULATA, p. 51,		*pustulatus*, Lea.	*pustulatus.*	*pustulatus.*	
“ QUADRULA, p. 51,		*asperrimus.*		*asperrimus.*	*pustulosus.*
“ BULLATA, p. 51,		*pustulosus*, Lea.	*pustulosus.*	*nodulosus*, Wood. *pustulosus*, Lea.	*Dorfeuillianus.*
ROTUNDARIA “ TUBERCULATA, p. 51.	? VERRUCOSUS, Bar.		*verrucosus.*	*verrucosus.*	*prasinus.*
“ SUBROTUNDATA, p. 52,		*circulus.*		*circulus, orbiculatus.*	*circulus.*
SCALENARIA “ OBLIQUATA, p. 53,		*ridibundus.*		*rotundatus.*	CLAVUS.
“ TRIANGULARIS, p. 53.		*sulcatus.*		*sulcatus.*	
“ SCALENARIA, p. 53,		CLAVUS, Lam.	CLAVUS, Lam.	*ellipsis.* *decisus*, var. ?	CLAVUS.
SINTOXIA “ SINTOXIA, p. 54,		Adopted.			
“ (OBOVARIA) OBOVALIS, p. 54,		*solidus*, Lea.		*ebenus*, Lea.	OBLIQUUS, Lam.
“ TORSA, p. 54,	RETUSUS, Lam.	RETUSUS.	RETUSUS.		
“ STRIATA, p. 54,		*subrotunda*, Raf.			
“ STEGARIA, p. 55,		*irroratus.*	*irroratus.*	*irroratus.*	
“ CORDATA, p. 55,	? OBLIQUUS, Lam.	Adopted.	Adopted.		*undatus*, Bar.
PLEUROBEMA MYTILOIDES, p. 56,	Adopted.	CLAVUS, Lam.	*pyramidatus.*		
“ CUNEATA, p. 56,		CLAVUS, Lam.			*trigonus*, Lea.
AMBLEMA OLIVARIA, p. 57,		*ellipsis*, Lea.			*ellipsis*, Lea.
“ RUBRA, p. 57,	? PYRAMIDATUS.	*pyramidatus.*	*pyramidatus.*¶	*pyramidatus.*	COCCINEUS.
“ TORULOSA, p. 57,		*perplexus.*			
“ GIBBOSA, p. 58,	? PERPLEXUS, Lea.	*perplexus.***	*perplexus.*	*perplexus.*	*perplexus*
“ COSTATA, p. 58,	? UNDULATUS, Bar.	*undulatus,*	*undulatus.*	*undulatus.*	*undulatus.*
ELLIPTIO (EURYNIA) TERES, p. 63,		*anodontoides.*	*anodontoides.*	*anodontoides*	
OBLIQUARIA (ELLIPSARIA) ATROVIOLACEA, p. 63.		DILATATA, Raf.	CRASSUS, ABRUPTUS		CRASSUS, Say.
TOXOLASMA CYCLIPS, p. 72,					
ANODONTA (LASTENA) OHIENSIS, p. 59.		*lævissimus*, Lea.		*laevissimus.* *dehiscens.*	*laevissimus.*
“ LATA, p. 59,				*oriens.*	
ALASMIDONTA (LASMIGONA) COSTATA, p. 60,		*rugosa*, Bar.		*rugosa.*	

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*I have not added Ferussac's determinations to these, because his opinions were principally based only on specimens received from Rafinesque. Mr. Conrad, in his "Monography," sometimes bases his identifications upon "authentic specimens," labeled by Rafinesque. Even if these specimens were *original types*, we would no more adopt their names over the later, but satisfactory descriptions of Mr. Lea, than we would accord priority to unpublished names over published ones.

†Only those species which have been identified by one or more of the authors quoted, are included in this table.

‡*U. cuneatus*, Bar., is a synonym.

‖*U. carinatus*, Bar., is synonym.

§Notwithstanding Prof. Haldeman's assertion that *Tappanianus* lives in the waters of Kentucky, I do not believe that it and *viridis* are the same species, or that the latter has ever been satisfactorily identified.

¶A synonym of *mytiloides ?*

**A synonym of *torulosa*.

II. *FOREIGN.*

British.

Annals and Magazine of Natural History. Vol. xiii., 3d series, No. 74, February, 1864.*

Characters of Coilostele, an undescribed genus of Auriculacea(?) and of species of Helix, Pupa and Ancylus from India, West Africa and Ceylon: BY W. H. BENSON.

Coilostele scalaris.
Helix palmaria.
" *contracta,* Hutton, MS.
Pupa Thibetica.
Pupa gutta.
" *eurina.*
" *ofella.*
Ancylus Ceylanicus.

Mr. Benson suspects that M. Bourguignat's *Ancylus Baconi,* represented to be from Bengal, is really Australian. *A. verrucai* Bens., Ann. and Mag., January, 1865, is believed to be the sole Indian species.

Notes on some Molluscous Animals from the seas of China and Japan: BY ARTHUR ADAMS.

Desc. of *Photinula quæsita*, A. Ad., and of the animals of *Serpulus Adamsi,* Mörch, *Pilidium commodum,* Midd., *Eburna Japonica*, Reeve, *Cancellaria Spengleriana*, Desh., *Turcica constricta*, Gould, and *Glyphis quadriradiata,* Sowb.

On the Classification of the Gasteropodous Mollusca: BY M. GOURIET.

" A division of the Gasteropoda founded on the generative organs presents this radical defect, that many species reputed to be hermaphrodite are constantly being found to be unisexual, and further that Mollusca evidently nearly allied, such as the *Helices* and *Cyclostomata*, are necessarily separated on the consideration of their sexual organs.

Therefore most authors have justly selected the respiratory apparatus as the basis of classification, since the position of this organ determines the position of the heart and generally that of the anus. In the classifications generally followed, such as that of Cuvier, however, orders are found to be established upon various characters of unequal importance although generally derived from the respiratory apparatus. Thus the Nudibranchs are generally characterized by their uncovered branchiæ, although with a restriction for the separation of the Inferobranchs, which are really also Nudibranchs. Elsewhere only the pectinated form of the organs is considered, as in the Pectinibranchs, although in other divisions, such as the Tectibranchs, this form of the branchiæ sometimes occurs. The term Tectibranch also conveys to the mind the same sense as Scutibranch. The expression Tubulibranch would seem to indicate a tubular form of the branchiæ, when it only refers to the tubular form of the animal. In the case of the Heteropoda the branchiæ are set aside, and a character of subordinate value, the form of the foot, is set on the same level as those of the preceding divisions. The word Cyclobranch would perhaps be the most suitable, but for the confusion between them and the Inferobranchs, if taken literally.

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* No. 73, January, 1865, has not been received by us.

In fact, in the establishment of orders, the position and form of the branchiæ, the form of the foot, and the general form of the animal have all been placed in the same rank, without assigning to any one of them a marked pre-eminence over the others. To remedy this defect the author proposes, taking the respiratory apparatus as his basis, to select the most important of its characters, and to establish the primary divisions upon this. He considers the position of the branchiæ to furnish the most important character. The branchiæ can only occupy three positions: they are either.

Completely external;

Or completely internal, and then concealed in a cavity which is itself covered by a shell which usually envelopes the animal;

Or simply protected by an imperfect test, a condition intermediate between the two preceding.

Hence, after the separation of the Pulmonata as a distinct subclass, we get three great divisions,—the Exobranchs, the Stegibranchs, and the Endobranchs.

I. The order of EXOBRANCHS may be subdivided, according to the point of the surface upon which the branchiæ are inserted, into—

1. *Epibranchs*, which have them on the back (*Doris*, *Glabellina*, &c.)
2. *Peribranchs*, which have them round the mantle (*Tritonia*, *Glaucus*, *Scyllæa*, *Plocamocera*, &c.) The *Eolidæ* would be allied to both the Epibranchs and Peribranchs.
3. *Hypobranchs* (the Inferobranchs of Cuvier). The *Thetydes* would approximate all three Orders.
4. *Pleurobranchs*, which have the branchiæ on the side (*Pleurobranchus*, *Pleurobranchidium*, *Laniogera*, &c.) The Pleurobranchs lead both to the Stegibranchs by their small test, and to the bulk of the Endobranchs by the pectinated form of the branchiæ.

II. The order of STEGIBRANCHS would include four divisions:—

1. *Stegibranchs* proper, corresponding to the Tectibranchs of

Cuiver (without the Pleurobranchs) and to the Scutibranchs of the same author.

2. *Cyclobranchs,* corresponding with Cuvier's group.
3. *Heteropod Stegibranchs* (Heteropoda of Cuvier,) which, if we take *Carinaria* as the type, have the heart and branchiæ within a small shell. The shelless Heteropoda must be left with *Carinaria.*
4. The *Ianthinæ,* which have their branchial laminæ half concealed by the shell, and which, like the Heteropoda, deserve to be separated on account of their curious appendage. Their pectinated branchiæ also form a transition from the Stegibranchs to the Endobranchs.

III. The order of ENDOBRANCHS would correspond with the Pectinibranchs and Tubulibranchs of Cuvier. They may be divided into *Turbinata* and *Tubulata.*

1. The *Turbinata* (the old Pectinibranchs) might retain the old Cuvierian subdivisions, or the much more natural division of De Blainville into Siphonobranchs and Asiphonobranchs.
2. The *Tubulata* are the old Tubulibranchs.

Comptes Rendus, Nov. 16, 1863, p. 826."

No. 75, April, 1864.

On the Species of Neæra, found in the Seas of Japan: BY ARTHUR ADAMS.

Several new species are described, and the following new sub-genera:—

Rhinomya, Cardiomya, Leptomya, Leiomya, Endopleura.

Characters of new Land Shells from the Mahabaleshwar Hills in Western India and from Agra in the Northwest Provinces: BY W. H. BENSON.

Achatina Arthuri, Helix Neherensis, Carychium Boysianum.

No. 76, April, 1864.

On some new Genera and Species of Mollusca, from the Seas of China and Japan: BY A. ADAMS.

Callocardia, n. g.
C. guttata.
Iacra Japonica.
Thecodonta, n. g.
T. Sieboldi.
Bucardia Cumingi.
Eucharis Recluzi.
" *Gouldi.*
" *Stimpsoni.*
Leptoconchus rostratus.
Opalia exquisita.
Smaragdinella Sieboldi.

Diagnoses of new Forms of Mollusks, collected at Cape St. Lucas, by Mr. J. Xantus: BY P. P. CARPENTER.

Asthenothærus, n. g.
A. villosior.
Solemya valvulus.
Lucina lingualis.
Crenella inflata.
Bryophila, n. g.

Tellina ochracea.
Psammobia regularis.
Callista pollicaris.
“ *puella.*
Levicardium apicinum.

B. setosa.
Atys casta.
Ischnochiton parallelus.
“ *prasinatus.*
“ *serratus.*

No. 77, May, 1864.

Note on Mr. Carpenter's Paper: BY LOVELL REEVE.

No. 78, June, 1864.

On the Classification of the Cyclostomacea of Eastern Asia: BY WM. T. BLANFORD.

New Genera.

Cyclotopsis. Type, *C. semistriatus,* Sowb.
Jerdonia. “ *J. trochlea*, Bens.
Cyathopoma. “ *C. filocinctum,* Bens.
Lagocheilus, Theobald, MS. Type, *C. scissimargo*, Bens.
Craspedotropis, (sub-gen.) Type, *C. involvulus,* Müll.
Georissa. (near *Hydrocena,*) Type, *G. pyxis,* Bens.

Diagnoses of new Forms of Mollusks, from Cape St. Lucas, &c., continued: BY P. P. CARPENTER.

Nacella peltoides.
Acmæa atrata.
“ *strigatella.*
Glyphis saturnalis.
Eucosmia (sub-gen. resembling *Phasianella.*)
Eucosmia variegata.
“ *substriata.*
“ *punctata.*
“ *cyclostoma.*
Haplocochlias, (close to *Ethalia.*)
“ *Cyclophoreus.*

Narica aperta.
Fossarus parcipictus.
“ *purus.*
Littorina pullata.
“ *penicillata.*
Rissoa albolirata.
Fenella crystallina.
Hydrobia compacta.
Hyala rotundata.
Diala electrina.
Acirsa Menesthoides.
Cynthia asteriaphila.
Bittium nitens.

Descriptions of new Species of Helix and Pupa, from the Colony of the Cape of Good Hope: BY W. H. BENSON.

Helix Arnotti.
“ *phytostylus.*
“ *capsula.*
“ *Hudsoniæ.*
“ *prionacris.*
“ *Browningii.*

Helix omphalion
Pupa Fryana.
“ *pamphorodon.*
“ *dadion.*
“ *Layardi.*

No. 79, July, 1864.

Outlines of the Geology of the Maltese Islands, with descriptions of the Brachiopods: BY THOS. DAVIDSON.

Diagnoses of new Forms of Mollusca, from Cape St. Lucas, &c., continued: BY P. P. CARPENTER.

Mangelia subdiaphana.
Drillia appressa.
Cithara fusconotata.
Obeliscus variegatus.
Odostomia æquisculpta.
" *delicatula.*
Chrysallida angusta.
Eulima fuscostrigata.
Opalia crenatoides.
Truncaria eurytoides.
Sistrum rufonotatum.
Nitidella millepunctata.
" *densilineata.*
Anachis tincta.
" *fuscostrigata.*
Pisania elata.

No. 80, August, 1864.

On a new British Species of Rissoa: BY E. WALLER.

Rissoa Jeffreysi.

On the Present State of Malacological Nomenclature: BY P. P. CARPENTER.

We republish this article:—

"At a time when the British Association are about to revise their 'Rules,' it may be worth while to collect the experience of workers in different branches of science.

The nomenclature of Mollusca is not only in a most unsettled condition, but there seems no hope of bringing leading writers to an agreement on any first principles. Dr. Gray, whose contributions to malacology are second to none, and whose position at the head of the department in the British Museum would alone give the greatest weight to his example, has systematically ignored the principles on which the British Association Rules are based. The Messrs. Adams in England, Mörch in Copenhagen, many of the German and most of the rising American naturalists take the same course. In France the influence of Lamarck has restrained the modern antiquarian innovation.

Existing writers may be divided into two classes—(1) those who profess the absolute law of priority, and (2) those who accept it with limitations.

The advocates of 'mere priority' claim that their rule is the only one which admits of fixed application. It is granted that, if limitations are once allowed, there will be differences of opinion as to their amount: but does the refusal of limitations produce uniformity? Putting aside the variations of opinion as to the greater or less division of genera, how can authors be brought to agree as to wherein the naming of a form consists? Those who compare Dr. Gray's 'Guide' with Adams' 'Genera,' or Dr. Gray's generic names at one date with his names at another, will find that the mere-priority rule is thoroughly uncertain in its application, principally in consequence of the very loose definitions, and probably loose ideas of the early writers. A modern author *thinks* that Klein or Link meant by a certain name a genus existing in his own mind, which he accordingly calls TALIS, *Klein*. But a second author thinks (and is quite sure he is right in thinking) that TALIS, *Klein*, means what is now considered a different genus, and alters the first author's series of names accordingly. Perhaps Klein meant neither the first, nor the second, nor both; but had a vague idea which it is now only confusing to endeavor to reproduce. The mere-priority writers often judge of the old authors by their types or figures; but even the Linnean genera cannot thus be understood, and many authors place their typical species in the middle of the series.

Once more, among the mere-priority writers, some accept a name only if published with description or figure: others, if the name be *printed* in a list or catalogue; others, if the name be *written* in a public, and others, even in a private collection. But perhaps the namer has only spoken the name, or merely thought it; according to the strictest law of priority, might not even these claim precedence?

If the principle of limitation be once allowed, questions of detail can be debated and settled with tolerable ease; and if one author calls his species *Grayi*, another *grayi*, and a third *Grayana*, we all know what is meant, and that may suffice. But if a modern author quotes a *Cyclas*, a *Capsa*, or a *Siliquaria*, who knows what is meant?

Nomenclature clearly is for USE, not for honor or fancy. That is the best which (1) expresses what it means, and (2) cannot mean anything else. That moreover is *publication*, in the highest sense; which is found to be in universal use. If in property there is a statute of limitations, and a given number of years' undisturbed possession is tantamount to a right, is there not the same reason for limiting property in a name? Why should not long accepted Lamarckian names be regarded as much sacred as are considered those of Linnæus.

If such are the difficulties of settling the language of the past, not much less are those of the present. In old times a *Buccinum*, a *Bulla*, a *Mya*, meant almost anything. In Lamarckian times, a *Chiton*, a *Cerithium*, a *Pleurotoma* meant what would now be called a family. If a writer describes under these genera, we know at least in what large division to search for his species. But if he describes a *Rissoa*, a *Modelia*, a *Truncatella*, we have a right to suppose he means what he says, and cannot be expected to look for his species in another suborder. of his *Rissoa* proves to be a *Chrysallida*, his *Modelia* a *Lacuna*, and his *Truncatella* a *Hydrobia*, is he entitled to priority if his successor, anxiously desirous to make out his species, has been compelled through necessary ignorance to redescribe? Very often neither the diagnosis nor the figure represent the real shell. If an author, seeing one object before his eyes, which he calls his type, describes another, and sends a third to the Cumingian collection to represent his species, for which must his name stand? Does it not really belong to the *idea in his own mind* which is embodied in his diagnosis, or (if an artist) in his figure, rather than to the shell which is not represented by either one or the other? A truthful name therefore, even though second or third in time, may be more *useful* to science than a false one given first.

Space only allows us to point out one more difficulty in modern nomenclature. In old times a species (and even a genus) was supposed to be clearly defined. The Darwinian theory offers a satisfactory explanation of some facts in nature, to many who are not prepared fully to accept it. Every worker among large series finds forms which may *or may not* prove conspecific with others, the evidence not being as yet conclusive; he describes these as doubtful ?varieties. Does not the careful naming and description of a *form* establish a claim for priority, whether by succeeding writers that form be regarded as a variety, a species, or even a genus?

It depends much on habit of mind whether authors prefer to work by large or by minute divisions. When we speak of *Callista undulata*, it is a matter of little consequence whether *Callista* be regarded as a sub-genus of *Cytherea* or a separate genus, whether *undulata* be regarded as a variety of *planulata* or a distinct species. What is of consequence is, that all the scientific world should have the means of knowing at once what group of forms are included in *Callista*, what kind of individuals in *undulata*. First, then, we need accurate descriptions, then these descriptions condensed into useful nomenclature. Science being a republic, there is no chance of even the forthcoming Rules of the British Association being considered obligatory. But many persons who will not allow themselves to be ruled, against what they consider a principle, may yet be brought to make concessions. The Academicians had great success in fixing the French language. Why should there not be a congress of malacological authors*, undertaken in a spirit of mutual respect, who should fix such names to existing genera as in each case should prove most

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* This was proposed, for naturalists in general, by Dr. Stimpson: *vide* 'Silliman's Journal,' for March, 1860, pp. 289–293.

useful because most widely or easily understood? If traveling is dear, postage is cheap. At present, to teach the science is almost hopeless; to labor in it is fraught to each worker with the unnecessary sacrifice of most valuable time. All considerations of supposed honor to individuals, whether dead or living (which often is equivalent to dishonor, because evidence of work done badly,) ought to give way to the manifest benefit, we might also say necessity, of using words to express a given meaning in science, as we do in common life."

No. 81, September, 1864.

Descriptions of Twenty-six new Species of Australian Land-shells: BY JAMES C. COX, M. D.

Helix Bloomfieldi.
" *conoidea.*
" *Lyndhurstensis.*
" *Mitchellæ.*
" *Mastersi.*
" *microscopica.*
" *Morti.*
" *Kreffti.*
" *Strondensis.*
" *marmorata.*
" *Strangeoides.*
" *Parramattensis.*
" *Nortoni.*
Succinea Macgillivrayi.
" *rhodostoma.*
Pupa Kingi.
Pupina Wilcoxi.
Pupinella Macgillivrayi.
" *Whartoni.*
Helicina Gladstonensis.
Helix costulata.
Pupa Ramsayi.
Bulimus Walli.
" *Onslowi.*
" *Jacksonensis.*

Species of Mollusca obtained in Corunna Bay: BY R. M'ANDREW AND H. WOODWARD.

Among the 150 species enumerated are *Cassis Saburon*, Lam., "agrees exactly with Reeve's description and figure, but locality given for latter—Japan;" *Cypræa condidula*, Gask., frequent at one particular locality. The species inhabits the Madeira and Canary Islands, and has not previously been detected in Europe. *Solarium Mediterranea*, Lam., is roported for the first time, on the Atlantic coasts north of Gibralter.

The genera *Ringicula*, *Mitra*, *Solarium*, *Solemya*, and the species *Cypræa candidula*, *Scalaria crenata*, *Dentalium dentate*, *Auricula Firminii*, *Chiton fulvus*, *Cardium ciliare* and *Lucina digitalis* are supposed here to reach their northern limit, while *Lucuna puteolus* is the only northern species which reaches its southern limit in the neighborhood of Corunna.

Cassis, *Murex Edwardsii*, *Purpura hæmastoma*, *Mangelia elegans* and *Lucina pecten* have been found on the coast of Asturias, and appear to extend to the Spanish or French shores of the Bay of Biscay.

No. 82, October, 1864.

Descriptions of new Species of Fluviatile and Terrestrial Operculate Mollusca, from Trinidad : BY R. J. LECHMERE GUPPY.

Ampullaria purpurascens.
Bithinia spiralis.
Valvata agglutinans.
Cyclotus Trinitensis.
Cyclotus rugatus.
Adamsiella aripensis.
Helicina zonata.
" *barbata.*

This fresh description of *Phryganiæ* as *Valvatæ* is amusing; naturalists seem resolved to consider them Mollusca!

Quarterly Journal of the Geological Society, vol. xx., parts 1, 2, 3; Feb. to Aug., 1864. Each 96 pp. 4s.

These numbers are full of very interesting papers, well illustrated by lithographic plates.

Transactions Zoological Society, London, v., part 3; 4to 1864.

Notice of a collection of Nudibranchiate Mollusca, made in India, by Walter Elliot, Esq., with descriptions of several new Genera and Species : BY JOSHUA ALDER AND ALBANY HANCOCK. 36 pp., with 6 colored plates.

Sowerby. Thesaurus Conchyliorum, part 23, 1864. Colored, 25s., plain, 16s.

Contains monographs of

Cyclostrema, Adeorbis, Teinostoma, by Arthur Adams.
Argonauta, Pomatias, by G. B. Sowerby.

Also, 3 plates illustrating a monograph of the family *Pupinidæ,* by A. Adams and G. B. Sowerby, the text of which will be published in part 24.

Cyclostrema contains 23 species, *Adeorbis* 21 species, *Teinostoma* 8 species. Of these the large proportion of 39 species were first described by the author. 2 plates.

Six species of *Argonauta* and eleven of *Pomatias* are described, illustrated by two plates and one plate respectively.

Voluta and *Melo* are completed from the last part, with 4 additional plates.

The following are the illustrations of *Pupinidæ,*

Megalomastoma, Policaria, 1 plate.
Cataulus, Registoma, Raphaulus, 1 plate.
Pupina, Pupinella, Callia, 1 plate.

Mr. Sowerby announces that part 24 will complete the 3d Volume of the Thesaurus, and the present Series. The *Volutidæ* will shortly appear separately as a monogpaph; other Genera and Families as completed, will be published in the same way. Accompanying the Thesaurus is a pamphlet, containing, with a colored plate, descriptions by G. B. Sowerby of *Voluta Ellioti, Conus nodulosus, Eburna Borneensis.*

Conchologica Iconica: BY LOVELL REEVE.

Venus, (Feb. 1864.)—Completeing the Monograph, which was commenced in 1863 and now numbers 141 species, with 26 plates. 21 of the species are new.)

(Another monograph of *Venus* is publishing as a Supplement to Novitates Conchologicae, by Ed. Rœmer.)

Dione, (Feb. 1864.)—62 species, 6 of them new. 12 plates.
Circe, " " 49 " 7 " " 10 "
Cytherea, (Jan. Feb. 1864.)—49 species, 8 of them new. 10 plates.
Tapes, (" Mar. ") 75 " 11 " " 13 "
Meroe, (March 1864.)—12 species, 1 of them new. 3 plates.
Solarium, (April 1864.)—21 species, 3 plates.

German.

On the Family Rissoidæ, II., Genus Risso. BY G. SWARTZ VON MOHRENSTERN. 4to., 58 pp., 4 pl., 3 of them colored. Gerold Vienna, 1864.

Fourty-seven species are enumerated, a number of which are fossil or sub-fossil.

SCIENTIFIC INTELLIGENCE.

NOTE ON THE GENUS SIMNIA, Risso.

H. & A. Adams (Genera, i. 273,) adopt this genus, giving as synonyms, *Scymnia* Leach, *Volva*, Flem., not Bolt., *Calpurna*, Flem., for a group of Ovulæ; and thus characterise it.

"Shell thin, involute, oblong, subfusiform; aperture expanded, contracted at both ends into short pointed canals; inner lip straight, slightly twisted in front; outer lip simple, acute, arcuated."

Mantle margin simple, tuberculated; foot long, broad, not longitudinally folded.

Three species of this genus are named, viz:—

Aperta, Sowb., *patula*, Pennant, *uniplicata*, Sowb. The first of these is figured by Sowb., Thesaur. Conchyl., pl. 107, fig. 106, 107, (Desc., No. 36,) from a single specimen in possession of Mr. Hanley; locality unknown. Notwithstanding Mr. Sowerby's assertion that the shell is mature, it does not from the figure appear to us to be so.

S. patula, Pennant, (Sowb., pl. 101, f. 105, 113, Text, No. 35,) an English species, is, according to Forbes & Hanley, an inhabitant of the south-western coasts, Lands-End, &c., and ranges to the Mediterranean. It is undoubtedly the same as *Adriaticum*, Sowb. (Thes. 99, f. 13, 14, sp. 12,) which has a thickened inflected denticulate outer lip. The *patulum is not mature.* I find in a series from Torbay, presented by Sowerby to the Academy of Natural Sciences, one specimen that *is* thus thickened, and also in the *Adriaticum*, Sowb., (Ex. Auct.,) one immature species which is exactly like the *patulum.*

Patulum has priority as the specific name, and *Adriaticum* must be placed in its synonymy.

The third species, *S. uniplicata*, Sowb. (Thes., pl. 100, f. 30–32, sp. 35,) has a very prominently thickened lip. It is excellently well figured. Specimens from South Carolina and Georgia, are in the Academy's collection. The genus *Simnia*, therefore, bereft of its species, will not stand, and must be considered synonymous with *Amphiperas*, Gronov., (*Ovula* Brug.,) into which its three species merge.

British Association for the Advancement of Science, 1864.
Papers Read.

On the Natural History and Cultivation of the Oyster. BY F. BUCKLAND.

On the Mollusca of Bath. BY J. E. DANIELL.

We notice the following among the Committees appointed:

For Dredging the Coast of Aberdeenshire.

For Dredging the Coasts of the Channel Islands.

For Investigating the Marine Fauna and Flora of Southern Coasts of Cornwall and Devon.

The name of J. G. Jeffreys appears on each of these Committees, and those of Mr. McAndrew, and the Rev. Mr. Norman on the second.

Prof. Haldeman's valuable collections of shells and fossils have been acquired by Meadville College, Pennsylvania.

We have received from Messrs. Westermann & Co., New York, "Schmidt's Natural History Catalogue," for 1864, containing many rare and valuable works on Conchology; also a list of species of Land and Fresh Water Shells from Turkey, &c., which will be sold at 1–5 thaler each species.

The collection of Prof. Grandidier is also advertised for sale in this Catalogue. It consists of 1677 species, and the price is 250 thalers.

Among the papers which will appear in future numbers of this Journal, we may name:—

Descriptions of new African Helices. BY A. D. BROWN.

Descriptions of a new Melania vnd Monocondylœa from Pegu, (with colored plate.) J. G. ANTHONY.

Descriptions of new American Unionidæ, (with colored plates.) BY J. G. ANTHONY.

Descriptions of new Fossil Testacea, (with plates.) BY T. A. CONRAD.

Review of the Goniobases of Oregon, of California, (with plate.) BY GEORGE W. TRYON, JR.

Descriptions of new Species of Fresh Water Shells from the Pacific States, (with colored plate.) BY GEORGE W. TRYON, JR.

On the Classification and Geographical Distribution of the Family Strepomatidæ. GEORGE W. TRYON, JR.

Several other papers are also being prepared for us by Messrs. Binney, Conrad, and others.

The attention of Conchologists is requested to the advertisement of a "Collection of Shells for Sale," printed on the third page of our cover.

The late Judge Cooper was very proud of this collection, which cost him much time and trouble to accumulate. It is particularly rich in marine shells, including over 2600 species of these, besides several hundred fluvatile and terrestrial species. Mr. P. P. Carpenter, writing about this cabinet remarks, "It contains a *peculiarly valuable* series of West Coast shells, of West Indian species of authentic localities, and of East Coast species.

This admirable collection we trust will pass entire into possession of some Scientific Institution, College, or Public Society, who, by acquiring it, will secure authoritively named and scientifically arranged cabinet, ready for immediate use in identifying, and studying the species of American Marine Mollusca.

Isaac Lea

AMERICAN

JOURNAL OF CONCHOLOGY.

Vol. I. APRIL 15, 1865. No. 2.

OBSERVATIONS ON THE FAMILY STREPOMATIDÆ.

BY GEORGE W. TRYON, JR.

1. Classification.

2. Geographical Distribution.

The following paper is the result of my investigations during the preparation of a monograph of the family, undertaken at the request of, and to be published by, the Smithsonian Institution. I am greatly indebted to its Chief, Prof. Jos. Henry, for granting permission to use any of the numerous wood-cuts which have been prepared for the monograph.

As I have already published, in the Proceedings of the Academy of Natural Sciences of Philadelphia, a full synonymy of the genera and species of *Strepomatidæ*, in the present paper I will discuss only *general considerations* relating to their classification and distribution I trust I may be excused for the extensive quotations which it has been thought necessary to make in the portion of the paper relating to classification. I have endeavored to present the *whole history* of the subject in such a manner as to save the trouble of reference to the numerous publications in which the papers quoted from have appeared.

1. *Classification.*—Swainson, who may be considered the originator of the modern system of classification of the Mollusca (as he was the first general conchologist who, breaking through the trammels of Lamarckian nomenclature, inaugurated the work since so boldly and successfully continued by Dr. Gray and Messrs. H. & A. Adams.) had, unfortunately, very little knowledge of the affinities with the other Mollusca, of the so-called Melanians inhabiting both America and the Old World, since he has confounded them with marine shells under his family *Turbidæ;* but, notwithstanding this error in the disposition of the whole group, he had the sagacity to separate into numerous, and generally well-characterized, genera, the incongruous matériel which Lamarck had allowed to remain under one generic name,—*Melania.*

Messrs. H. & A. Adams* approach more closely to the present ideas of conchologists relating to this subject, by separating from, but placing in close neighborhood to, the *Cerithiadæ*, their family *Melaniidæ*, of which they admit two subfamilies, *Melaniinæ* including those shells with "aperture simple in front, without a distinct notch," = various genera of Melanians; and a second subfamily, characterized by a notched aperture to the shell, including *Melanopsis,* Lam. Dr. Gray, the only other recent systematist who has investigated the subject,† adopts a family *Melaniadæ,* including the subfamilies *Rissoaina, Melaniaina, Triphorina, Scalarina,* and *Litiopina,* with a heterogeneous assemblage of marine and fluviatile genera: the *Melaniaina* comprising all the genera of American and exotic Melanians, the Cerithians, and the shells which I recently separated under the family name of *Amnicolidæ.*

It is strange that neither European nor American conchologists who have studied this family have availed themselves until quite recently of the obvious differences, both in shell and animal, between the American and Oriental forms, for their complete separation, notwithstanding the fact that Prof. Haldeman showed our Melanians to have a plain or entire margin to their mantle, whilst the Oriental species had the mantle-margin fringed, thus allying the latter more closely with the Cerithians than with the so-called American Melanians.

Dr. Brot, a gentleman who has devoted much attention to the Melanians, remarks‡ that the generally adopted classification of the family is very confused and uncertain, but does not attempt to propose a new one.

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* Genera of Recent Mollusca, i. 293.

† List of the Genera of Recent Mollusca, Proceed. Zool. Soc., London, 1847.

‡ Cat. syst. des Especes qui composent la Famille des Melaniens.

Mr. Lovell Reeve, who has published an elaborate monograph of the family,[*] in his preface assigns to the animals of *all* the species a fringed mantle-margin.

Prof. S. S. Haldeman was the first naturalist who detected the difference between our own and the Oriental Melanians;[†] but he did not at that time apply the results of his examinations to their obvious separation into two families.

Mr. Isaac Lea in 1862 proposed a new genus of Melanians, *Goniobasis*,[‡] which, with other genera previously admitted, and *including Melania*, Lam., he still continued to regard as belonging to the family *Melaniidæ*, although in a foot-note he writes, "I very much doubt if we have a single species in the United States which properly belongs to this genus."

Mr. Theodore Gill, in a recent paper on the classification of our fluviatile Mollusca,[§] assigns the following characters to the family *Melaniidæ*:—

"Teeth of lingual membrane, 3·1·3; gills concealed; rostrum moderately produced and entire or simply notched; foot not produced beyond the head; branchiæ uniserial; lateral jaws present.

"Aperture of shell acuminate behind; generally channelled at front; size moderate.

"The family of *Melaniidæ* is here restricted to exclude *Faunus*, Montfort (= *Pyrena*, Lam.,) *Melanatria*, Bowditch, *Melatoma*, Sw. (= *Clionella?* Gray), *Melanopsis*, Lam., *Vibex*, Oken, and *Hemisinus*, Sw. These appear to belong to a distinct family, equally distinguished by the projecting foot of the animal and the notch of the aperture of its shell.

"The family may be named *Melanopidæ*.

"The other genera or subgenera that have been proposed scarcely appear to exist in nature. * * * *

"The American *Melaniidæ* form a peculiar subfamily,—*Ceriphasinæ*."

Subsequently, in a foot-note,[‖] Mr. Gill mentions the reason which caused him to make the above subfamily. "The American *Melaniidæ*, so far as I know, have not a fringed mantle, and, consequently, belong to a different group." We readily admit the propriety of separating the *Melanopidæ* from *Melaniidæ*, as a distinct family, and only wonder that Mr. Gill did not make a *family* of *Ceriphasinæ*, as the distinctive characters of the animal so far as known to us, and of the shell undoubtedly, are quite as important as those which he assigns to his *Melanopidæ*. When we come to consider the geographical distribution of the two groups, the reasons for this separation are still more obvious. We find the *Melanopidæ* distributed over both hemispheres, while the *Ceriphasinæ* are entirely restricted to North America, to the exclusion almost entirely of the *Melanopidæ*, and totally of the fringe-mantled *Melaniidæ*. We find them inhabiting this faunal province in immense numbers of species, exuberantly varied in form, size, weight and color, presenting a number of described (and many undescribed) genera,—in fact, exhibiting all that redundancy of character and isolation of position which are the sure indications of a primordial separate existence.*

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[*] Conchologica Iconica,—*Melania, Anculotus, Io, Melatoma.*

[†] Amer. Jour. Science, xli. 1, 21.

[‡] Proceed. Acad. Nat. Sciences, May, 1862.

[§] Systematic Arrangement of the Mollusks of the Family Viviparidæ, and others, inhabiting the United States.—Proc. Acad. Nat. Sci., p. 33, Feb., 1863.

[‖] *Ibid.* p. 35.

The publication of Mr. Gill's paper re-directed Prof. Haldeman's attention to the subject, which he had left unfinished in his investigations at an earlier period; and the result is the publication of a short but important paper in the Proceedings of the Academy of Natural Sciences, September, 1863, entitled, "On Strepomatidæ as a Name for a Family of Fluviatile Mollusca usually confounded with Melania," wherein he finally separates our species as a distinct family, remarking that the Oriental Melanians are not so nearly allied to ours as they are to the *Cerithiadæ*,—with which conclusion we cordially agree.

We have, therefore, adopted the name *Strepomatidæ* as indicating a distinct family, in preference to the prior name of

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* It has become fashionable lately to disparage the value of the *mere* shells as a means of distinguishing generic and family groups, and to rely wholly on such differences as may be found in the animals. Without denying the great importance which should properly be accorded to the latter, we would insist that, in general, the *expression* of these differences may be observed in the shell, and that at least very few generic distinctions have been made from the study of the animals which have not been also indicated plainly enough by the shell. The study of Malacology is yet in its infancy, and those who figure in it are very apt to give undue importance to the characters on which they rely for building up their systems. To investigate how many characters of form or function have successively been called forth as the most important to stand godfathers at the baptisms of new genera, would be curious, but lamentable.

One thing is certain, that genera founded on the shells alone are always found to be corroborated by the study of the animals, while many genera founded on differences in the animal have remained unverified, and will continue so, owing to the undue importance given to the difference of form relied on for the generic distinction.

We do not regard the differences, so far as discovered, in the animals of our so-called Melanians from the Oriental *Melaniidæ*, as of sufficient importance to justify their separation: We are contented to separate them upon considerations connected with the shell only and with geographical distribution, and accept the differences in the animals as merely corroborative, for the present, believing, however, that other and more important distinctive characters will reward the industry and skill of some future Malacologist.

Ceriphasinæ, the adoption of which would still leave our species in connection as a subfamily with shells to which they are not at all closely related.

In endeavoring to eliminate, from the rather confused synonymy, generic and subgeneric groups of *Strepomatidæ*, some difficulty is encountered at the threshold, on account of the various opinions held by the different naturalists who have studied them, regarding the relative importance which should be assigned to various characters of the shell, in constituting these divisions.

The genus *Hemisinus*, Swainson (*Basistoma*, Lea,) belongs to Mr. Gill's family *Melanopidæ*. The little *Paludomus brevis*, D'Orb., of the West Indies, is apparently the American representative of an exotic genus; the large tuberculate Melanians of Central America, and the smooth Pachycheili of that country and of Mexico, probably do not belong to our family *Strepomatidæ*.

Thus the range of the species of the family may be considered as restricted within the borders of the United States.*

Swainson formed the following curious generic system for the shells under consideration :—†

Family TURBIDÆ.

(Subfamilies *Ampullarinæ*, *Melanianæ*, *Turbinæ*, *Janthinæ*.)

Subfamily MELANIANÆ.

Genus PALUDOMUS, Swainson.
  Subgenus ANCULOSA, Say.
Genus MELANIA, Lam.
  Subgenus HEMISINUS, Swainson.
Genus MELANOPSIS, Lam.
  Subgenus MELAFUSUS, Swainson.

Subfusiform, the base contracted, and the aperture and spire nearly equal. 1 species. America. (= Io.)

Subgenus MELATOMA, Swains.

Fusiform, longitudinally ribbed; a deep sinus at the top of the outer lip; base contracted, channel wide. *M. costata*. (This species, mistaken by some for our genus Schizostoma, is actually an exotic marine shell = genus *Clionella*.)

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* Three or four are extra-limital, inhabiting Cuba and Mexico; but these do not constitute one per cent. of the whole number of species.

† Manual of Malacology, 1840.

Genus CERITHIDEA, Swainson.

Clavate, cerithiform; aperture subemarginate.

Subgenus CERITHIDEA, Swains.

Shell light, decollated; outer lip semicircular, dilated by a flattened border; aperture emarginate. *C. lineolata*, Griff. Cuv., t. 14, f. 4. *C. fragilis*, *Ibid.* t. 32, f. 12. (= POTAMIDES.)

Subgenus CERIPHASIA, Swains.

Cerithiform; outer lip thin, dilated at the base; aperture small, slightly emarginate, without any internal groove; inner lip thin. *C. sulcata*, Sw., fig. 38. Founded on certain Ohio shells resembling *Cerithidea?*

It will be noticed that in the above classification *Melafusus* is a subgenus of *Melanopsis*, which belongs to the family *Melanopidæ*, while *Ceriphasia* is a subgenus of *Cerithidea*, which includes shells belonging to the family *Cerithiidæ*!

Dr. Gray (Proceed. Zool. Soc., London, 1847, p. 153) makes the following division of his subfamily *Melaniaina*, which in many respects is very correct. He separates the exotic genera from the American, and of the latter quotes the following:—

ANCULOTUS, Say, 1825.

Anculosa, Swains., 1840—*A. præmorsa*, Say.
Melanopsis, sp., Moricand—*M. crenocarina.**
Anculosa, sp., Anthony—*Anc. rubiginosa.*
Melania, sp., Say—*Melan. obovata.*

MELATOMA, Anthony, 184– ? not Swains. 1840.

Melat. altilis, Anthony.

IO, Lea, 1832.

Fusus, sp., Say, 1825. } *Fusus fluviatilis*, Say.
Melafusus, Swains., 1840. }
Melania, sp., Say—*Mel. armigera*, Say.

CERIPHASIA, Swains. 1840.

Gray, Syn. 1844.

Melania, sp., Say—*Ceriphasia sulcata*, Swains.
? *Telescopella.*
Melania, sp., Say—*Mel. undulata*, Say.

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* = *Verena*, H. & A. Adams: certainly not an *Anculosa.*—T.

GLOTELLA, Gray.

Melania armigera, Say.

Messrs. H. & A. Adams (Genera of Recent Mollusca) propose the following classification :—*

"CERIPHASIA, Swainson, (i. p. 297.)

Shell subfusiform, whorls transversely sulcate, the last angulated; spire acuminated; aperture small, produced in front, with a small groove-like canal at the fore part; outer lip thin, posteriorly sinuated.

Syn. *Telescopella*, Gray.

Ex. *C. canaliculata*, Say, t. 31, f. 6.

The shell of *Ceriphasia* is covered with a dark-green epidermis, and is more like that of *Io* than any other of this family; it may, however, be distinguished from *Io* by the beak being shorter, and by the whorls being sulcated and not spiny."

acuta, Lea.
Alexandrensis, Lea.
annulifera, Conr.
canaliculata, Say.
elongata, Lea.
exarata, Lea.
Haleiana, Lea.
Kirtlandiana, Lea.
lugubris, Lea.
luteosa, Gould.
Ordiana, Lea.
regularis, Lea.
spurca, Lea.
subularis, Lea.
sulcosa, Lea.
symmetrica, Hald.
Vainafa, Gould.
Virginica, Gmel.†

"Genus PACHYCHEILUS, Lea, (i. 298.)

Operculum suborbicular, of several whorls. Shell subfusiformly conical, smooth, solid; aperture ovate, entire anteriorly; columellar lip thickened posteriorly; outer lip thick.

The chief peculiarity of this genus is the thickened outer lip; it differs from *Melanopsis* in having no sinus at the fore part of the aperture, and from *Melania* in having a callous columella.

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* We quote the full lists of species given by Messrs. Adams, in order that the insufficiency of their genera may become more apparent from the incongruous assemblage of shells of which they have composed them. Prof. Haldeman writes (Proceed. Acad. Nat. Sciences, p. 274, Sept., 1863,) "The groups of Messrs. H. & A. Adams often indicate merely sections; and sectional names given as generic are scientifically erroneous, because they erect certain species into genera and subgenera only when they belong to extensive groups, requiring numerous specific names, whilst the same amount of character goes for nothing in groups which have but few species."

† The species here assembled are principally *Goniobases*, but are included in *Ceriphasia* evidently because they are "transversely sulcate." *M. Virginica* and its synonym *multilineata* are again introduced in *Juga*, a subgenus of *Vibex*, Oken !

M. canaliculata, Say, is introduced, but *undulata*, Say, does not appear, while *filum*, Lea, a very closely allied species, is placed in *Elimia*, a subgenus of *Io*.

The operculum has the nucleus subcentral, and is composed of two or three spiral revolutions.

dubiosus, Say. *ferrugineus*, Lea. *simplex*, Say.*

“Subgenus POTADOMA, Swainson, (i. 299.)

Shell ovate, solid; spire short, whorls smooth; inner lip somewhat thickened; aperture produced in front; outer lip acute, simple.

depygis, Say.
gracilis, Lea.
inornatus, Anth.
lævigatus, Lea.
Niagarensis, Lea.
Ocoeensis, Lea.
ovoideus, Lea.
rufescens, Lea.
sordidus, Lea.
subcylindraceus, Lea.
subsolidus, Lea.
Wardérianus, Lea.†

“Genus Io, Lea, (i. p. 299.)

Shell subfusiform, whorls spinose; aperture large, ovate, dilated anteriorly, produced in front into a grooved beak; outer lip simple, acute.

Syn. *Melafusus*, Swains., *Glotella*, Gray.

Ex. *I. fluviatilis*, Say, t. 31, f. 8. Operculum, f. 8, *a*, *b*.

The species of *Io* inhabit the rivers of North America; the shells, like those of most of the *Melaniidæ*, are covered with a brown, black, or olivaceous epidermis, and are remarkable for the peculiar elongation of the axis anteriorly, and for the spinose nature of the last whorl.

armigera, Lea.
Duttoniana, Lea.
Florentiana, Lea.
fluviatilis, Say.
fusiformis, Say.
nobilis, Lea.
pagodula, Gld.
pernodosa, Lea.
plicata, Lea.
robulina, Anthony.
spinigera, Lea.
spinosa, Lea.
tenebrosa, Lea.
tuberculata, Lea.‡

“Subgen. ELIMIA, H. & A. Adams, (i. p. 300.)

Shell fusiformly ovate; whorls reticulate or nodulose, carinate in the middle; aperture greatly produced anteriorly; outer lip thin, simple, acute.

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* The genus *Pachycheilus* was instituted by Mr. Lea to comprise a certain form of shells attaining their greatest numerical development in Central America. There are no shells inhabiting the United States which are congeneric with these; and Messrs. Adams have entirely mistaken the scope of the genus in including such species as *simplex*.

† = *simplex*, Say, which Messrs. Adams place in the genus *Pachycheilus* as typical!

‡ Among the species here enumerated are *Angitremæ*, *Anculosæ*, *Lithasiæ*, *Strephobases*, *Goniobases*, and *Pleuroceræ*. *I. pagodula* is an exotic species, and does not belong to the genus.

acuticarinata, Lea.
apis, Lea.
bella, Conrad.
Boykiniana, Lea.
caliginosa, Lea.
cancellata, Say.
carinocostata, Lea.
catenaria, Say.
catenoides, Lea.
elevata, Lea.
filum, Lea.
Holstonia, Lea.
nodulosa, Lea.
Potosiensis, Lea.
spinalis, Lea.
torta, Lea.

" MELANIA, Lamarck.

Subgen. MELASMA, H. & A. Adams, (i. p. 300.*)

Shell solid; spire elevated, whorls smooth, longitudinally plicate; aperture produced anteriorly; inner lip simple, thin; outer lip acute, simple.

blanda, Lea.
brevispira, Anthony.
clavæformis, Lea.
Comma, Conr.
concinna, Lea.
costulata, Lea.
crebricostata, Lea.
Curreyana, Lea.
Deshayesiana, Lea.
Edgariana, Lea.
laqueata, Say.
Lecontiana, Lea.
nitens, Lea.
plicatula, Lea.
plicifera, Lea.

" Genus HEMISINUS, Swainson, (i. 302.)

Shell subulate; whorls smooth, simple, numerous; aperture ovate, anteriorly contracted, canaliculate and emarginate in front; outer lip thin, crenulated at the edge.

Syn. *Tania*, Gray, *Basistoma*, Lea.

Ex. *H. lineolatus*, Wood, t. 32, f. 2, *a*, *b*.

This genus comprises many fine species of fresh-water shells, principally from South America, though a few have been regarded as inhabitants of other countries.

bulbosus, Gould. *symmetricus*, Conr. *lineolatus*, Wood.†

" Genus VIBEX, Oken, (i. 303.)

Shell turreted; whorls tuberculated, spirally ridged or muricate; aperture subcircular, produced and broadly channelled in front; outer lip thin, simple.

Syn. *Claviger*, Hald., *Melania*, Swains., not Lamarck.

" Subgenus JUGA, H. & A. Adams, (i. 304.)

Shell thin; whorls rounded, transversely lirate or furnished with elevated transverse lines; aperture produced anteriorly; outer lip simple, acute.

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[*] This genus = the plicate species of *Goniobasis*. *M. brevispira*, however, is never plicate, although included with the species.

[†] The first two enumerated do not belong to this genus, nor have they the slightest affinity with any of its species.—G. W. T., JR.

Buddii, Say.*
circincta, Lea.
exilis, Hald.
multilineata, Say.
obruta, Lea.
occata, Hinds.
proteus, Lea.
proxima, Say.
Schiedeana Phil.
silicula, Gld.
striata, Lea.
Troostiana, Lea.
Virginica, Say.

"Genus GYROTOMA, Shuttleworth, (i. 305.)

Shell ovate, turreted; whorls transversely sulcate; aperture oblong; inner lip thickened, with a posterior callosity; outer lip thin, with a deep, narrow, posterior fisure.

Syn. *Schizostoma*, Lea, not Bronn, *Melatoma*, Anthony, not Swainson, *Schizocheilus*, Lea.

Ex. *G. ovoidea*, Shuttleworth, t. 32, f. 4, *a, b*.

The fissure in the outer lip is wanting or obsolete in the subgenus *Megara*, the species of which in other respects closely resemble those of *Gyrotoma* proper. Both groups are American in their geographical distribution.

altilis, Anthony.
Babylonica, Lea.
Buddii, Lea.
conica, Say.
constricta, Lea.
curta, Migh.?
curvata, Say.
cylindracea, Migh.?
excisa, Lea.
Foremani, Lea.
funiculata, Lea.
incisa, Lea.
laciniata, Lea.
ovoidea, Shuttl.
pagoda, Lea.
pyramidata, Shuttl.†

"Subgenus MEGARA, H. & A. Adams, (i. p. 306.)

Shell ovate, solid; whorls transversely sulcate; aperture ovate-oblong, subcanaliculated anteriorly; outer lip thin, simple, acute.

alveare, Conr.
arctata, Lea.
auriculæformis, Lea.
basalis, Lea.
brevis, Lea.
crebristriata, Lea.
harpa, Lea.
Haysiana, Lea.
Hoeydei, Lea.
impressa, Lea.
lateralis, Lea.
lima, Conr.
oliva, Lea.
olivula, Conr.
ovalis, Lea.
pumila, Lea.

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* Should read *Buddii*, Lea. *M. exilis*, Hald., and *proxima*, Say, certainly do not belong here. I have already remarked upon *M. Virginica* and *multilineata*.

† Mr. Anthony never described *Gyrotoma altilis*, ranked among these species. *G. conica*, Say, is the young of *Pleurocera canaliculata*. There are, besides, frequent mistakes in all these lists, in misquoting authorities.—T.

solida, Lea.
torquata, Lea.
undulata, Say.
Vanuxemiana, Lea.[*]

"Genus LEPTOXIS, Rafinesque, (i. 307.)

Shell ovate or globose, solid, subperforate; spire very short; aperture oval; inner lip with a posterior callosity, often anteriorly callous and produced; outer lip thin, sinuous, with a posterior, ascending canal.

Syn. *Anculotus*, Say, *Anculosa*, Swains., *Ancylotus*. Herm.

Ex. *L. prærosa*, Say, t. 32, fig. 6, *a*, *b*.

The species of this genus are peculiar to the North American rivers; the spire of the shell has a truncated, eroded apex, and, in the typical species, the shell is solid and subglobose, with the aperture simple in front.

abrupta, Lea.
angulata, Conr.
crassa, Hald.
flammata, Lea.
fuliginosa, Lea.
fusca, Hald.
fusiformis, Lea.
gibbosa, Lea.
globula, Lea.
Griffithsiana, Lea.
Hildrethiana, Lea.
integra, Say.
melanoides, Conr.
Nickliniana, Lea.
nigrescens, Conr.
obtusa, Lea.
picta, Conr.
pilula, Lea.
pisum, Hald.
plicata, Conr.
prærosa, Say.
pumilis, Conr.
rubiginosa, Lea.
squalida, Lea.
subglobosa, Say.
tæniata, Say.
tintinnabulum, Lea.
trivittatus, DeKay.
Troostiana, Lea.
turgida, Hald.
variabilis, Lea.
virgata, Lea.
viridis, Lea.[†]

"Subgenus NITOCRIS, H. & A. Adams, (i. 308.)

Shell thin, subglobose; whorls angulated, often carinate; inner lip subtruncate, or ending in a tubercle.

carinata, Lea.
costata, Lea.
dentata, Couth.
dilatata, Conr.
dissimilis, Say.
ebena, Lea.

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[*] Here we find shells belonging to several groups, as *pumila*, Lea, *alveare*, Conr., and *torquata*, Lea, to *Strephobasis; lima*, Conr., and *solida*, Lea, to *Lithasia; undulata*, Say, to *Pleurocera*. *Hoeydei*, Lea, was never described. Can it be intended for *Hydei*, Conr.? The species are generally, however, the ponderous *Goniobases* of Northern Alabama.

[†] In the species of this genus there are several errors, some quite elongated forms being included; also, a species of *Lithasia*.

inflata, Lea.
Kirtlandiana, Anth.
monodontoides, Gld.
occidentalis, Lea.*
Rogersii, Conr.
subcarinata, Hald.

"Subgenus LITHASIA, Lea, (i. 308.)

Shell thick, solid, ovate; whorls gibbose or tuberculated at the hind part; aperture subcanaliculated and produced in front; inner lip with a callus posteriorly, subtruncate anteriorly.

genicula, Hald.
neritiformis, Desh.†
obovata, Say.
salebrosa, Conr.
semigranulosa, Desh."

Chenu (Manuel de Conchyliologie) principally follows the arrangement of Messrs. Adams.

Lovell Reeve monographs separately *Io*, *Hemisinus*, *Anculotus*, and *Melatoma*, and treats all the species not included in those genera as *Melaniæ*. He says, "Advantage might have been taken of the labors of systematists to have distributed them into further genera; but more materials are needed for their elucidation than we at present possess."‡

R. J. Shuttleworth (Mittheil. der Nat.-forsch. Gesellsch. in Bern. No. 50, p. 88) proposed, July 22, 1845, a new American genus of fluviatile shells, which he characterized as follows:

"GYROTOMA.—Shell turreted; columella incurved, above callously thickened; aperture oval, subeffuse at the base; lip simple, acute, narrowly profoundly fissured above.

"Animal.—Operculum corneous, spiral."

This forms one of the most distinct of the genera of *Strepomatidæ*. Mr. Lea, however, anticipated Mr. Shuttleworth's discovery.

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* = in some respects *Mudalia*, Hald., and *Somatogyrus*, Gill.

† *Neritiformis*, Desh., is an *Anculosa*, and is a syn. of *A. prœrosa*, Say.

‡ It is very much to be regretted that Mr. Reeve did not make some kind of a division, however arbitrary, of the immense material entering into his magnificent monograph of *Melania*, as he *has* published it. Species from all countries, without regard to external resemblances, are, in many cases, grouped on its plates indiscriminately, rendering the identification of shells by its aid exceedingly difficult. Even several of the species are duplicated in description and illustration in the monographs of *Melania*, *Io*, and *Anculotus*.

While on the subject of Mr. Reeve's monograph, we cannot refrain from condemning the substitution of new descriptions of the species for those originally given. The descriptions of Mr. Reeve in numerous cases entirely neglect the most important specific characters. The plates frequently do not represent the species for which they are intended; but in this Mr. Reeve has been undoubtedly deceived by wrongly-named specimens.

It is a strange fact that, notwithstanding the length of time which has elapsed since very many of our *Melanians* and *Unios* have been described, and the large number which have been sent to Europe in scientific exchanges, European conchologists are still to a great extent ignorant of the most prominent and important specific characters.

Dr. Brot, in his admirable "Systematic Catalogue of the Melanians," proposes, instead of the genera of H. & A. Adams, a series of sections, which are generally excellent, for the arrangement of the species. The following is his plan:—

1. *Operculum concentric.*

Genus PALUDOMUS, Swainson.

2. *Operculum spiral or subspiral.*

* Aperture entire.

Genus LEPTOXIS, Raf.

(*Anculotus*, Say; *Anculosa*, Conr.)

Genus MELANIA, Lam.

- Group *a*, type *canaliculata*, Say.
- " *b*, " *curvilabris*, Anth.
- " *c*, " *Haysiana*, Lea.
- " *d*,
  - *a*, type *Virginica*, Say.
  - *b*, " *costulata*, Lea.
  - *c*, " *perangulata*, Conr.
  - *d*, " *simplex*, Say.
  - *e*, " *Warderiana*, Lea.
- " *e*, " *nupera*, Say.
- " *f*, (European.)
- " *g*,
  - *a*, " *lævissima*, Sowb.
  - *b*, " *glaphyra*, Morelet.
  - *c*, " *nigritina*, Morelet.

(All the other groups of this section, thirteen in number, are exotic.)

** *Aperture produced in front.*

Genus IO, Lea.

*** *Aperture truncate in front.*

(MELANOPSIS, HEMISINUS.)

**** *Aperture posteriorly sinuate.*

Genus GYROTOMA, Shuttlw.

***** *Aperture sinuate in front and posteriorly.*

(PIRENA, Lam.)

Passing to American authors, we find Mr. Say was the first to eliminate a native genus from the genus *Melania*. In his description of *Melania præerosa*, he says, "This shell does not seem to correspond with the genus to which I have for the present referred it; and, owing to the configuration of the base of the columella, if it is not a *Melanopsis*, it is probable its station will be between the genera *Melania* and *Agathina*. I propose for it the generic name of *Anculosa*."

He also remarks, in his subsequent description of *M. subglobosa*, "It is a second species of my proposed genus *Anculotus*."

Mr. Say never *described* his genus; but the above citation and description of two species, both of which are well known, and whose identity with his descriptions has never been questioned, entitle his generic name to be received as authority.

Rafinesque published the following genera which have been referred to *Strepomatidæ*:—

"*Pleurocera*, Raf. (Jour de Phys. Bruxelles, vol. lxxxviii. p. 423, 1819.) Shell spiral, oval, or pyramidal, of numerous convex volutions. Aperture obliquely oblong, the base prolonged and twisted, sharp above. Outer lip thin, the inner lip appressed, twisted, without umbilicus. Animal with a membranaceous operculum.

"Head proboscidiform, inserted on the back; tentacles two, lateral, subulate, sharp, with eyes at their exterior base.

"Family of *Neritacea*. Species numerous, of which I have already twelve, all fluviatile, from rivers and creeks, as well as the following genera."*

By some strange mistake, this genus is referred by Messrs. H. & A. Adams to *Vivipara*.

Rafinesque published several species; one of which, *P. verrucosa*, is identical with *Lithasia nupera*, Say, and therefore belongs to an entirely different group. Others, however, are evidently closely related to *M. canaliculata*, Say, and *M. elevata*, Say. The genus is certainly well characterized, and clearly includes those shells which Mr. Swainson has subsequently distinguished as *Ceriphasia*, and Mr. Lea as *Trypanostoma*.

In the same Journal, (p. 26,) Rafinesque described a genus "*Leptoxis*" as follows. "*Leptoxis*. Differs from *Lymnula* by an oval shell, inflated, the spire of two or three whorls; aperture

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*Rafinesque previously described *Pleurocera* in a short paper published in the American Monthly Magazine and Critical Review, iii. p. 354, 1818 (Binney & Tryon's Edit. of Rafinesque, p. 22,) as follows:—

"Shell variable oboval or conical, mouth diagonal crooked, rhomboidal, obtuse and nearly reflexed at the base, acute above the connection, lip and columelle flexuose entire. Animal with an operculum membranaceous, head separated from the mantle inserted above it, elongated, one tentaculum on each side at its base, subulate acute, eyes lateral exterior at the base of the tentacula."

This description was doubtless intended for all the elongate species of Melanians from the Ohio River then known to him, but he afterwards amended it as above.

In his "Enumeration and Account" (Binney & Tryon, p. 67,) Rafinesque describes several species of *Pleurocera*, and remarks, "My *G. Pleurocera*, 1819, is perhaps a S. G. of *Melania*, but the animal is different, with lateral feelers; the shell is always conical oblong, with the opening oblong oblique acute at both ends, columella flexuose twisted;" and, further, "I leave the name of *Melania* to the shells with opening obtuse at the end; or they may form the S. G. *Ambloxis*."

oval, almost as large as the whole shell. Eyes exterior. About four species, fluviatile, lacustrine, and palustrine."

There can be no doubt that this description was *intended* for *Anculosa*, Say, as is proved by a MSS. work by Rafinesque ("Conchologia Ohioensis") in the possession of the Smithsonian Institution, in which there is a rude pen-and-ink drawing of the animal and shell of a *Leptoxis*. The name has been adopted by Prof. Haldeman and others. But as the *published* description refers equally well to *Physa* or some species of *Lymnæa*, and as MSS. authority is not recognized in questions of priority, we are compelled to throw aside this name and adopt that given by Say.

In the MSS. quoted above, occurs the description of a new genus called *Strepoma*, together with the figure of a species; which appears to represent a section of *Pleurocera*. It is unnecessary to quote the description, as it was never published: it is only mentioned here because Prof. Haldeman adopts it as a generic name in a late paper on the classification of these shells.*

For the same reason, we do not adopt the genus *Ambloxis* described in the American Monthly Magazine, p. 355, 1818:—

"Univalve.—Shell thick oboval, mouth oval, rounded at the base, obtuse above, with a thick appendage of the lip, columelle flexuose, a small rugose umbilic."

This, the only description, would apply equally well to a *Paludina*, *Anculosa* or a *Goniobasis* of Lea; and in 1831 (Enum. and Account,) although he renders it plain that he intended the latter, still he does not adopt the name for his species there described, and seems disposed to doubt the value of his former division.

The three following genera were published in Journal de Physique, Bruxelles, tome 88, p. 423 et seq.:—

"*Ellipstoma*, Raf.—Shell thick, oval, obtuse. Mouth oblique, narrow, elliptic, lips thickened, united, and obtusely decurrent posteriorly. A narrow, oblong umbilicus, half covered by the interior lip. Animal unknown. Fluviatile genus of 4 species, *E. gibbosa*, *E. vittata*, *E. zonalis*, and *E. marginula*.

"From the Ohio, Mississippi, &c."

"*Oxytrema*, Raf.—Differs from *Pleurocera* by an oval oblong or ventricose shell, less number of whorls, the last forming nearly the whole: mouth sharp on both sides, and anteriorly prolonged into a long sharp point. 3 fluviatile species."

"*Campeloma*, Raf.—Shell oval; mouth oval, base truncated, lip reflected, united in a posterior point. No umbilicus. Animal unknown. I have only one species, found in the

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* Proceed. Acad. Nat. Sciences, p. 274, September 1863.

Ohio,—*C. crassula.* Four whorls of the spire reversed? apex acute, shell thick, mouth more than half the total length."

Messrs. H. & A. Adams, with *very* doubtful propriety, refer this genus to *Melanopsis.* Prof. S. S. Haldeman, in an article on Mollusca, contributed by him to the American edition of Heck's Iconographic Encyclopædia, II. p. 84, remarks that

"Say's *Melania armigera* (and also Lea's *M. duttoniana* and *M. catenoides*) belongs to Rafinesque's genus *Pleurocera,* in which there is a short, straight canal anteriorly, and when this canal is lengthened, as in *Fusus*, the genus *Io*, of Lea, is the result.

"*Strepoma,* of Rafinesque (or *Ceriphasia,* of Swainson,) are slightly different forms, in which the aperture and the vertical plate formed by the anterior portion of the whirls, bear some resemblance to the same parts in *Cerithium telescopium.*"

In October, 1840, Prof. Haldeman published a supplement to his "Monograph of the Limniades," containing, among other matter, the following proposed

"Subgenera of ANCULOSA.

"*Anculosa*, Say.—Substance of the shell thick and heavy, labium much thickened.

"*Lithasia,* Hald.—Shell heavy, having protuberances; aperture with a notch in the nacre above and below.

"*Paludomus,* Swains.—Shell smooth, margin of the outer lip crenated, labium very thick and enamelled.

"*Hemimitra,* Swains.—Like *Paludomus*, but with coronated whorls.

"*Mudalia*, Hald.—Shell smooth, thin in texture; labium without enamel."

In his description of a species of *Anculosa* published upon the same occasion, Prof. Haldeman refers to "*Paludina* (*Mudalia*) *dissimilis*, Say," so that there can be no doubt as to the section of *Anculosa* indicated by the subgenus *Mudalia.* On the cover of No. 2 of the monograph (January, 1841) is the description of "subgenus *Angitrema.* Shell spinous, aperture subrhomboidal, with an anterior sinus. Ex. *Melania armigera*, Say."

I adopt *Angitrema* as a *genus,* with *Lithasia* as a subgenus of it. *Mudalia* cannot stand in the system, because its characters are not constant, *Anc. dissimilis* having frequently a heavy deposit of nacre on the columella.

Mr. Lea has described several new genera of shells eliminated from the American *Melaniæ.* He early recognized in Mr. Say's genus *Anculosa* a good natural genus, and adopted it in his descriptions. In Philos. Trans. VIII. p. 163, he proposed to separate the species of *Melania* according to certain obvious external (by no means generic) characters, for facility in their determination. He described a large number of species under the following divisions:—

"1. Smooth.
2. Plicate.
3. Carinate.
4. Sulcate.
5. Striate.
6. Tuberculate.
7. Granulate.
8. Cancellate.
9. Spinose."

Perhaps this division of the species suggested to Messrs. Adams the genera which they have adopted in their classification.

In Philos. Trans., IV., p. 122, Mr. Lea proposed to institute a new genus, *Io*, for the *Fusus fluvialis*, of Say. His description is, "Io.—Shell fusiform; base canaliculate; spire elevated; columella smooth and concave."

In his description ot *Melania excisa*, and *Anculosa incisa*, published in Philos. Proc., II. p., 242, Dec. 1842, Mr. Lea suggested the name *Schizostoma* for those species having a pleurotomose sutural slit in the outer lip. The genus thus proposed, and which bears the same relation to *Goniobasis* as *Schazicheila* does to *Helicina*, was some time afterwards characterized by Mr. Shuttleworth, from independent observation, under the name of *Gyrotoma*.

In Philos. Proc. Aug. 1845, and in the Transactions, x. p. 67, 1853, Mr. Lea published the following description of his genus:—

"SCHIZOSTOMA Lea. Shell conical or fusiform. Lip fissured above. Aperture ovate, columella smooth, incurved. Operculum.—

"No operculum has come under my notice; but I can scarcely doubt that it will be found to be horny, and to resemble, in other respects, that of *Melania*."

Subsequently (vol. x., p. 295,) Mr. Lea says, "When I proposed the name of *Schizostoma* for a genus of *Melaniana* with a cut at the superior portion of the aperture, I was not aware that M. Bronn had already used that name for a fossil genus. I now propose to substitute *Schizocheilus.*"

In the Proceedings of the Academy of Natural Sciences of Philadelphia, 1860, p. 63, Mr. John G. Anthony makes some lengthy remarks on this genus, as follows:—

"*Gyrotoma*. As some confusion exists regarding the name of this genus, the following notes are given:—

"The genus *Melatoma* was established by Swainson, and first given to the world in 1840, in his 'Treatise on Shells and Shell Fishes,' published in London, founded, as he says (p. 202,) 'upon a remarkable Ohio shell sent him many years before by his old friend Prof. Rafinesque." 'It has,' he remarks, 'the general form of a *Pleurotoma* and of a *Mela-*

fusus, with a well-defined sinus or cleft near the top of the outer lip, while the inner, though thin, is somewhat thickened above.' The other characters named by him are such as are generally considered rather specific than generic, and the pleurotomose cut in the outer lip, as applied to a fluviatile univalve, is altogether sufficient to indicate a new genus. The specimen alluded to by Swainson, and from which his generic description was drawn, was an imperfect one; and the species has not since been identified by American naturalists. This is less to be wondered at when we consider how very local the genus has always been, and how few specimens have found their way into our collections. The waters of Alabama have as yet monopolized this interesting genus,; and it is probable that even there it is confined almost, if not quite, exclusively to the Coosa and its tributaries.

"On p. 342 Swainson gives the following generic description, adding a figure:—

"'Fusiform, longitudinally ribbed; a deep sinus at the top of the outer lip; base contracted; channel wide.'

"Mr. Swainson's figure is quite unsatisfactory. His genus *Melatoma* is referred doubtfully to *Clionella* by H. & A. Adams, and has not prevailed for this genus in America or Europe. I have, therefore, decided not to make use of it in this case.

"Subsequently this genus has been noticed by various authors, and other names have been applied to it. In 1841 or 1842, Dr. J. W. Mighels sent me specimens of one species, under the name of *Apella scissura;* but his generic name was never published, and his species, if not identical with any which Mr. Lea afterwards described, seems to have been overlooked and forgotten.

"On the 14th of December, 1842, Mr. Lea read a paper before the American Philosophical Society, in which he describes *Melania excisa* and *Anculosa incisa*. In his remarks upon these species he alludes to the pleurotomose cut in the superior part of the upper lip, and at the same time suggests the necessity, in consequence of this character, to construct a new genus, which he proposed to call '*Schizostoma*.' Mr. Lea finding his name '*Schizostoma*,' pre-occupied in Palæontology, changed it to '*Schizochilus*' (March 5, 1852, Obs., v., p. 51). In a paper read May 2, 1845, Mr. Lea, in a foot-note to p. 93, first indicates the generic characters of *Schizostoma*, as follows,—'Testa vel conica vel fusiformis; labrum superne fissura; apertura ovata; columella lævis, incurva,'—and describes six additional species.

"In the above concise definition of the genus, it will at once be noted that the fissure at the upper part of the outer lip is after all the *essential* character; and Mr. Lea himself seems to be aware of this, since, of the six species then described, he states the aperture to be elliptical in five cases and rhomboidal in the other, although his generic character is 'aperture ovate.' Indeed, in the species described by him but a single one has the aperture ovate, and that one is described as an *Anculosa.*

"It may be doubted whether Mr. Lea's first name will not eventually prevail, since, before he published *Schizostoma*, Bronn's genus of the same name (Lethea Geogn., I., 95, 1835–37,) had been called a synonym of *Bifrontia* (*Omalaxis*) of Deshayes. (Vide Desh. in Lam, IX., p. 104.) Indeed, H. & A. Adams (Gen. Rec. Moll., I., 305,) do not appear correct in giving preference to *Gyrotoma* over *Schizostoma*, Lea, on account of *Schizostoma*, Bronn, since (on p. 244) the latter is placed in the synonymy of *Omalaxis.*

"Another generic name *Schizostoma* is quoted in Hermannsen's Index. I have not obtained access to the work containing this description; but its date is said to be anterior to Mr. Lea's description.

"Mr. Lea's second name, *Schizochilus,* had been previously used in Coleoptera, but withdrawn after Mr. Lea's description was published.

"Mr. Shuttleworth, in July, 1845, (Mittheilungen der Naturforschenden Gesellschaft in Bern, p. 88,) gives another description of the genus under the name of *Gyrotoma*, founded on two species from the Coosa River, descriptions of which are also given.

"The generic name of Mr. Shuttleworth has been adopted in H. & A. Adams' Genera of Recent Mollusca (i. p. 305, February, 1854.)

"Dr. Gray also (Guide to Mollusca, i. p. 103, 1857) adopts Shuttleworth's name.

Such being the confused state of the synonymy of the genus, we have decided to adopt, at least temporarily, the earliest name concerning which no doubt exists."

To the above, Mr. Lea made the following reply, upon occasion of describing some new species belonging to the genus, in Proc. Acad. Nat. Sciences, Philada., May, 1860:—

"Genus SCHIZOSTOMA.

"It will be observed that I have here adopted my first name (*Schizostoma*) for the division of those *Melanidæ* which have a cut or fissure in the upper portion of the last whorl. This name I proposed in December, 1842. Subsequently finding that it was used by Bronn in 1835, I abandoned it, and proposed the name of *Schizochilus* as a substitute, (Obs. on the Genus Unio, v. 5, p. 51, 1852, and Trans. Am. Phil. Soc., 1852.) I am now satisfied that Bronn's name was applied to the same genus—*Euomphalus*—which Sowerby established in 1814, (Min. Conch., tab. 45.) This evidently liberates my original name, and Herrmannsen, in the appendix to his "Generum Malacozorum," very properly restores it. It was supposed that this was the *Melatoma* of Swainson, and Mr. Anthony adopted this name. But it is evident that Mr. Swainson's *Melatoma* is not my *Schizostoma*. By reference to his figure (Malacology, p. 342, f. 104) it will be observed at once that there has never been observed in the United States any of the group of which that figure is the type, while it is known that they exist in the islands of the Indian Ocean. Mr. Swainson says, (p. 202) that his *Melatoma* was 'founded upon a remarkable Ohio shell' sent by Rafinesque. Now, as no member of the family *Melanidæ* with a cut in the lip has ever been found in the Ohio, where such hosts of active collectors have since pursued their investigations, it is perhaps beyond the bounds of possibility that the specimen sent by Rafinesque, so eminently careless and reckless as he always was, should ever have been found there. Indeed, if the specimen figured was sent by Mr. Rafinesque to Mr. Swainson, then the question would arise whether it had not been obtained by Mr. R. from some dealer or collector, who may have obtained it from Asia. I have no doubt of the *Melatoma costata*, which Mr. Swainson has figured, being exotic, and belonging to a group probably from the Philippine Islands. Mr. Anthony says, page 64, Proc. A. N. S., 1860, that 'it may be doubted whether Mr. Lea's first name will not eventually prevail, since, before he published *Schizostoma*, Bronn's genus of the same name had been called a synonym of *Bifrontia*, Desh.' And that 'H. & A. Adams (Gen. Rec. Moll., i. 105) do not appear correct in giving preference to *Gyrotoma* over *Schizostoma*, Lea,' &c. Notwithstanding this, Mr. Anthony in this paper, where he describes nine supposed new species of this genus, adopts the generic name of *Gyrotoma*. It may be added here, that Dr. Gray, in his *Genera of Recent Mollusca*, gives *Melatoma* to Mr. Anthony, not to Swainson, while he does not notice the name of *Schizostoma*. Mr. A. does not pretend to claim it, of course, but adopts *Gyrotoma*, Mr. Shuttleworth's name, proposed in 1845, which, being three years later, cannot have precedence.

"The genus *Schizostoma* seems to be capable of being divided into two natural groups in the form of the *fissura*, the cut in the lip. In one group this fissura is deep and direct, that is, parallel with the suture or upper edge of the whorl; in the other it is not deep and is oblique to the suture."

In the same Journal, (April 1862,) was published a new genus with the following name, description and remarks:—

"Genus TRYPANOSTOMA, Lea.

"Shell conical; aperture rhomboidal, subcanaliculate below Lip expanded. Columella smooth, twisted below. Operculum corneus, commencing spiral.

"The enormous number of species in the genus *Melania* has made it very desirable to eliminate as many as possible, by founding new genera, where well characterized groups can be established. With this view I proposed, in the Proceedings of the Academy, in April last, the genus *Strephobasis*. The genus now proposed under the name of *Trypanostoma* will include all the well known *Melania* with an *auger-shaped aperture*, the type of which may be considered to be Mr. Say's *Melania canaliculata*, a very common and well known species from the basin of the Ohio River. It will include a number of large species; indeed, nearly all of the large and ponderous species of the United States. Many new ones will be found in this paper. Objections may be raised against now increasing the number of genera without the aid of the examination of the soft parts. But there is no validity in this objection, from the fact that, in the present condition of the science of Malacology, we are becoming acquainted with a vast number of new and interesting forms, without the hope at present of seeing the organic portion of the animals. These may at some future time, and no doubt will, be examined and carefully described by zoologists who may dwell near the waters where these numerous and highly-developed species reside. Until this takes place, we can only group them upon the characters which are presented by their outward hard portions, which are accessible to us now.

"In proposing this new genus, I am aware that European Zoologists have made many genera and subgenera in this Family, but none have made groups of our numerous species by which they can be properly divided. They have mixed them up, with all the time and care they have bestowed upon them, in a manner so as to make great confusion.

"Mr. Swainson, in his 'Treatise on Malacology,' proposed a subgenus of *Melania* under the name of *Ceriphasia*, and gives a figure, page 204, (*C. sulcata*,) stating it came from Ohio. It is evident, on looking at this figure, that it does not represent any Ohio species, neither in the aperture nor in the revolving ribs. Dr. Gray and Messrs. Adams adopt the genus, and the latter give a figure (pl. 31, fig. 6,) of *canaliculata*, Say, as the type, which I do not think answers to the description or figure of Mr. Swainson. Dr. Gray, in his excellent 'List of the Genera of Recent Mollusca,' in the Proc. Zool. Soc., expressed a doubt whether his *Telescopella* may not be the same with *Ceriphasia*."

In April, 1861, Mr. Lea proposed another genus, as follows:

"*Strephobasis*, Lea.—Shell cylindrical; aperture subquadrate; columella thickened and retro-canaliculate below.

"Operculum commencing spiral, corneus.

"The mollusk, for which I propose this genus, was sent to me by Wm. Spillman, M. D., of Columbus, Miss., and I have before me over a dozen specimens from a third to nearly an inch in length. The very great number of species of the genus *Melania* makes it desirable to eliminate any group, with characters sufficiently distinct to permanently recognize it. The very remarkable retrorse callus at the base of the column, causing a lateral sinus, is characteristic of this genus."

Next we have the genus *Goniobasis*, intended to include most of the vast residue of species not previously eliminated. This genus, proposed in Proc. Acad. Nat. Sciences, May 1862, is described as follows:—

"*Goniobasis*, Lea.—Shell conical or fusiform. Aperture subrhomboidal, subangulate below. Columella thickened somewhat above. Operculum commencing spiral, corneus.

"In my paper on the genus *Trypanostoma*, proposed by me, (Proc. Acad. Nat. Sci., 1863, p. 169,) I mentioned the importance of eliminating as many species as possible from the genus *Melania*, which is so enormously extended as almost to prevent the possibility of finding suitable names for the species. In the Proceedings of the Academy, Dec., 1861, I stated that Prof. Haldeman's genus *Lithasia* formed a very excellent group. In working up a very large number of the family *Melanidæ*, obtained from the Southern and Western States, I have, notwithstanding the divisions which had been made, found myself embarrassed with that form of aperture which is quite different from the auger-mouthed (*Trypanostoma*) species and the *Lithasia*, to which latter they are most nearly allied. I mean those which usually, though not always, have a slight thickening of the upper part of the columella and no callus below, and which are also without the notch of *Lithasia*, although subangular at base. In this subangular character they differ from *Melania* proper, which are round or loop-like at the base. For this group I propose the name of *Goniobasis*,* which will give us for our American *Melanidæ* the following genera, all of them having spiral opercula:—

"*Melania*,† Lam,, *Anculosa*, Say, *Io*, Lea, *Lithasia*, Hald., *Schizostoma*, Lea, *Strephobasis*, Lea, *Trypanostoma*, Lea, *Goniobasis*, Lea, and *Amnicola*, Gould and Hald.

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* Adams' *Elimia* takes in part of this genus.

† Cuvier describes *Melania* as having long tentacula, the eyes being on the exterior side about the third of the length. The eyes of *Melania Virginica*, Say, are at the base of short tentacula. I very much doubt if we have a single species in the United States properly belonging to this genus, which Cuvier considered *amarula* as the type, and Lamarck, *asperata* as the type.

"They may be known by,

"*Melania* having a regular loop-form aperture.

"*Anculosa* having a rounded aperture and a callous columella.

"*Io* having a greater or lesser elongate channel or spout at the base.

"*Lithasia* having a callus on the columella above and below, and a notch at the base.

"*Schizostoma* having a cut in the upper part of the outer lip.

"*Strephobasis* having a retrorse callus at base, and usually a squarish aperture.

"*Trypanostoma* having an expanded outer lip and an auger-shaped aperture.

"*Goniobasis* having usually a subrhomboidal aperture, subangular at base and without a channel.

"*Amnicola** having a round mouth and no callus."

In Proc. Academy of Nat. Sciences, Jany., 1864, Mr. Lea proposed the following:—

"*Meseschiza.*—Shell fusiform, imperforate. Aperture rhomboidal, below canaliculate. Lip expanded, slit in the middle. Columella smooth, incurved. Operculum corneous, spiral.

"The little shell which I now propose as a new genus, has so distinct a character in the incision of the middle of the outer lip, as to mark perfectly its place in the *Melanidæ* of the United States. It differs entirely in the character of the cut from that in *Schizostoma*, which has, in all the many species I have seen, a more or less deep incision immediately under the suture. The living soft parts have not yet been observed. They may, when examined, prove to have some characteristics quite different from *Schizostoma.*"

Eurycælon.—In remarks on *Goniobasis umbonata*, (Proc. Acad., p. 3, Jan. 1864,) "This is the fourth species of a natural group which I have described and which have a large ear-shaped aperture. If they be not entitled to a generic place, they may at least be considered a subgenus, for which I propose the name of *Eurycælon*, the aperture being larger than in the *Melanidæ* generally. All the species of *Eurycælon* have a callus on the columella above, but not below, as in *Lithasia*, and the base is more or less angular, which is not the case with *Anculosa*. Those which we have considered as varieties of *Anculosa prærosa*, Say, which have an angular base, properly belong, I think, to *Eurycælon*, as well also *Anthonyi*, Redfield, *turbinata*, and *tintinnabulum* (nobis,) and some others. When the soft parts shall be examined, they will, I think, be found to differ from *Goniobasis*, *Trypanostoma* and *Lithasia*, to which genera they seem nearest allied. The operculum of the only one I have seen, is the same as *Goniobasis,* and the *Melanidæ* generally."*

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* *Amnicola*, although much like *Paludina*, is more nearly allied to the *Melanidæ*. The operculum is spiral, and, therefore, very different in this character from *Paludina*.

Dr. James Lewis (Proc. Acad. Nat. Sciences, Dec., 1862, pp. 588–90) describes the soft parts of *Melania subularis* and *Melania exilis,* and remarks in conclusion, that "The following features of the two species above considered may suffice for placing them apart in subgenera:—

"1. The presence of a sinus or fold in the sides of the foot and neck of *M. subularis*, and its absence in *M. exilis.*

"2. The extension of the anastomosing black lines from the margin of the lateral portions of the foot upwards along the side of the neck in *M. subularis*, and the restriction of these lines to a narrow zone along the lateral portions of the foot of *M. exilis.*

"3. A well-defined dark band around the tentacle in *M. exilis*, not observable, or at most only faintly indicated in *M. subularis.*"

Dr. Lewis endeavors, by these differences, to indicate respectively the genera *Trypanostoma* and *Goniobasis* of Mr. Lea; but, unfortunately, the only *important* character of distinction mentioned by him, is only a sexual difference.

And now, having cited all that has been done in the classification of these animals by American and Foreign naturalists, we will first ascertain the *sequence* of the genera, and then give their names and limitation as we propose to adopt them.

Swainson commenced with the species having an entire aperture, then he described genera possessing a truncated aperture, (*Hemisinus, Melanopsis,*) and, finally, those with a more or less developed channel at the base.

Dr. Gray's arrangement does not differ essentially; he *adds*, however, *Glotella*, an intermediate form between the *Trypanostomoid* and *Goniobasic* groups.

Messrs. Adams *commence* with the canaliculate species, but not with the highest developed type of that form,—*Io.* They give the preference to *Ceriphasia,* Swainson, and next give *Pachycheilus,* which is certainly more of a *Goniobasic* form, and *then* give *Io.*

Dr. Brot's "Groups" represent nearly the following value and sequence in genera:—*Leptoxis, Trypanostoma, Goniobasis, Lithasia, Pachycheilus, Io, Melanopsis, Gyrotoma, Pirena.*

Mr. Lea, in remarks on his description of *Goniobasis*, gives

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*Mr. Lea probably did not intend to include his *tintinnabulum* in *Eurycœlon*, but did so inadvertently. I would add to the description as given above,—shell generally obovate, longitudinally humped or angled; columella truncate below. The genus may be placed between the *Lithasia* and *Goniobases.*

the list of genera, (which we have quoted,) but apparently in the order of their publication.

The sequence of genera in the foregoing examples, can certainly be much improved; *Io* may be considered as the highest development of the canaliculate shell, and is also the largest in size; we find, moreover, as Mr. Lea has justly remarked, the most ponderous species among the *Trypanostomæ* (*Pleurocera.*) I would then commence with *Io*, and proceed thus:—*Io*, *Pleurocera*, *Angitrema*, *Lithasia*, *Strephobasis*, *Eurycælon*, *Goniobasis*, *Schizostoma*, *Mesechiza*, *Anculosa*.

We thus proceed from a long canaliculate aperture to one in which the aperture is entire, we also commence with the largest and close with the smallest species. *Pachycheilus* is not included in the above, because it represents an extra limital group, and will probably be found to belong to another family, or subfamily. The same may be said of *Hemisinus* and *Paludomus*.

With regard to nomenclature, we will examine—

1. *Io*, Lea.—We find this genus universally recognised. European authors, however, do not seem to understand its true limits, and include species of *Lithasia*.

2. *Pleurocera*, Raf.—Notwithstanding Mr. Lea's assertion that Swainson's figure of *Ceriphasia sulcata* does not represent a species of this genus, nor his description correspond to it, I believe that *Ceriphasia* was certainly intended for that group of *Trypanostomoid* shells represented by *canaliculata*, Say, and that the figure represents some such shell as *T. moriforme*, Lea. Gray also, in 1847, proposed *Telescopella* for *Melania undulata*, Say, which belongs to the same group.

Thus, Mr. Lea's *Trypanostoma* is unquestionably a synonym. *Pleurocera*, Rafinesque, is the same shell, and having priority over all the other names; I adopt it without hesitation.

Strepoma, Raf. MSS. applies to the same genus, and *Oxytrema*, Raf. (Jour. de Physique,) may be intended for some immature form of *canaliculata*. or its allies, which possesses the sharp-pointed aperture described,—as *Io variabilis*, Lea, for instance.

Messrs. Adams adopt *Ceriphasia*, but they separate certain species, reticulate, or nodulosely carinate in the middle, to form their genus *Elimia*. Their *Megara*, also, consists of species of this genus.

Of course these names are not founded on generic characters, and, at best, can only be used to designate groups.

3. *Lithasia*, Haldeman.—This genus is recognized by Messrs. Adams, but Mr. Reeve and Dr. Brot confound its species with *Io*. Prof. Haldeman first proposed it as a subgenus of *Anculosa*. "Shell heavy, having protuberances." This char-

acter applies only to certain species; but the genus is now recognized by American naturalists to include all the species with the columella thickened above and below.

Prof. Haldeman's subgenus *Angitrema* is synonymous with, and has priority over, *Glotella*, Gray, both adopting *Melania armigera*, Say, for their type. As this subgenus really exhibits the highest development of the species, I have concluded to adopt it as a genus, using *Lithasia* as a subgenus for the smaller, smooth forms.

4. *Strephobasis*, Lea.

5. *Eurycælon*, Lea.

6. *Goniobasis*, Lea, May 1862.—This genus will retain Mr. Lea's name. *Potadoma*, Swainson, as understood by Messrs. H. & A. Adams, embraces certain species only. These gentlemen take some species of this, *Strephobasis* and *Pleurocera*, to make their *Megara*, a subgenus of *Gyrotoma* (*Schizostoma !*)

They make of the plicate group, *Melasma*, and of the striate species they form *Juga*. These names may be retained as sections of the genus, possessing no really generic characters.

7. *Schizostoma*, Lea, Dec., 1842.—Messrs. Adams, Brot and Anthony, adopt *Gyrotoma*, Shuttleworth, July 22, 1845, because *Schizostoma* was pre-occupied.

Mr. Lea was himself of the same opinion, and changed the name to *Schizocheilus ;* (also pre-occupied.) He subsequently reclaimed the original name, and I give him the genus as first published, having two and one-half years' priority over Shuttleworth. I entirely agree with Mr. Lea, that *Melatoma*, Swainson, represents an exotic, and not an American, group. Mr. Anthony is ignorant how *his* name came to be used in connection with *Melatoma*. It was first so used by Dr. Gray,* (perhaps through inadvertance,) and afterwards by Mr. Reeve.

8. *Mesechiza*, Lea.

9. *Anculosa*, Say.—*Leptoxis*, Rafinesque, as already mentioned, is not described definitely enough to justify its substitution for Say's name. Prof. Haldeman, with the aid of Rafinesque's MSS. work, identified the genus and used the name. He has been followed by Messrs. Adams, Brot and Binney, while Messrs. Lea, Conrad, Anthony and Reeve, have adhered to the old name. I think that *Ellipstoma*, Raf., (Jour. de Phys.,) really applies to this genus much better than *Leptoxis*, and might be readily taken to represent such a form of it as *crassa*, Hald.

Prof. Haldeman proposed a subgenus *Mudalia* for certain thin species without enamel on the labium, and probably *intended* to include such globose forms as *altilis*, Lea, &c., but

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*Mr. Anthony never described such a shell as *Melatoma altilis*, Anth., referred to by Dr. Gray.

the only species which he *cites* under the name, are *dissimilis*, Say, and *turgida*, Hald., both *carinate* shells. I am convinced, from studying numerous examples, that the characters of *Mudalia* are not persistent. The *globose* form of so-called *Anculosæ*, represented by *altilis*, does not belong to the family. Mr. Gill has proposed for it the generic name *Somatogyrus*, and it is now included in *Amnicolidæ*.

These same Virginia and Ohio thin species, together with the dentate forms, compose the subgenus *Nitocris*, H. & A. Adams, a synonym, anyhow, and otherwise of no value. Mr. Anthony proposes to me to call such shells as *Anculosa monodontoides* '*Spirodon*,' but the toothed columella is not even a constant specific character.

The characters assigned to *Io*, *Pleurocera*, *Angitrema*, *Lithasia*, *Strephobasis*, *Eurycælon*, *Goniobasis*, *Schizostoma*, *Meseschiza* and *Anculosa*, are by no means of equal value. I regard the first five as members of the *Trypanostomoid* section of the family, of which *Io* is a genus, with *Pleurocera* for a subgenus. *Lithasia* should, perhaps, be considered a subgenus only of *Angitrema*, which is the highest development of this form, having the thickened columella.

Strephobasis occupies a position between *Lithasia* and *Goniobasis*, but I think that it, also, should be considered a subgenus of *Angitrema*.

Eurycælon, *Goniobasis*, *Schizostoma*, *Meseschiza*, and *Anculosa*, are certainly distinct genera; the first four approximate, forming the *Goniobasic* group or section; and the last forms a section by itself, characterized by an entire aperture.

Yet this arrangement is liable to exception, as *all* the species of a genus do not fulfill the ideas here conveyed. Some species, on the contrary, remind one of genera which do not immediately succeed or precede them. Moreover, anatomical researches will enable us probably to separate the *natural* genera of this family much more sharply than we are now doing, and may enable us to seize on *corroborative characters* of the shell, which are now overlooked, or whose importance, in this connection, have been thus far underestimated.

Synopsis of Genera of Strepomatidæ.

1. Aperture produced into a more or less obvious canal in front. *Trypanostomoid Section.*

  1. Shell fusiform inflated on the periphery.

  Spire and canal produced; columella without deposit of nacre. Io, Lea.

  (Plate 17, fig. 1.)

  Shell conical, or oval, canal not so much produced. Subgenus PLEUROCERA, Raf.

  (Plate 17, figs. 2, 3.)

  2. Shell oval, or turbiniform, or fusiform, with a revolving row of nodules on the periphery, canal short. Columella callously thickened above and below. ANGITREMA, Hald.

  (Plate 17, fig. 4.)

  Shell oval or oblong, smaller, either smooth or adorned with nodules around the upper portion of the body whorl. Subgenus LITHASIA, Hald.

  (Plate 17, fig. 5.)

  Canal retrorse. Subgenus STREPHOBASIS, Lea.

  (Plate 17, fig. 6.)

2. Aperture merely angulated in front, with no canal, and the the columella not twisted, frequently callously thickened above. *Goniobasic Section.*

  3. Shell obovate, heavy, nodulosely angled, aperture ear-shaped; columella oval, truncate. EURYCÆLON, Lea.

  (Plate 17, figs. 7, 8.)

  4. Shell heavy, oval, truncate, oblong, or turrited; aperture entire above. GONIOBASIS, Lea.

  (Plate 17, figs. 9, 10.)

  5. Aperture with a sutural, pleurotomose slit above. SCHIZOSTOMA, Lea.

  (Plate 17, fig. 11.)

  6. Lip slit in the middle. MESESCHIZA, Lea.

3. Aperture entire and rounded in front.

  7. Shell oval, heavy; columella callously thickened above. ANCULOSA, Say.

  (Plate 17, fig. 12.)

2. *Geographical Distribution.*—We have, in North America, nearly five hundred recognized species, of the shells belonging to the various genera of *Strepomatidæ*. So considerable a moiety of these are found to be inhabitants of the upper Tennessee River and its branches in East Tennessee and North Alabama, and of the Coosa River in the latter State, that we quite agree with Mr. Lea in regarding that region as the great centre of this kind of animal life. We have ascertained that, leaving out the species inhabiting the Pacific States and those which in the descriptions have their habitats designated by States only,* of the remainder, full two-thirds belong to the above two streams; including three entire genera, nearly all the species in several others, and a *majority* of the species of every genus except one (*Meseschiza,*) of a single species.

The *Strepomatidæ* do not appear to flourish in the neighborhood of the sea, and nowhere have the species been found numerous within a hundred miles of our coasts; nor do they approach the more northern latitudes of the Middle and Western States, very few species being found so far north as the Ohio River.

The Mississippi River also, seems to have formed, from the junction of the Ohio until its mouth, an insurmountable barrier to the geographical dispersion of these shells.

Thus, we find the district of our country, which they inhabit in such profuse numbers of species and individuals, to be really of somewhat limited extent, and may give its boundaries as follows:—*North,* the Tennessee River and tributaries. The Cumberland Mountains prevent the dispersion of the species of this river to the northward until its course is directed into Alabama. Here the character of its species (which we shall again allude to further on,) changes, and they become gradually less numerous and of greater geographical dispersion, as the river runs towards the west. *East,* the mountain range of the Blue Ridge, running southwestwardly into the interior of Northern Georgia. Thence, the Chattahoochee River and tributaries, to within about a hundred miles of the Gulf. *South,* the species are restrained from spreading by the influence of the Gulf of Mexico. *West,* the Alabama, Cahawba and Black Warrior Rivers and their tributaries, those of the latter reaching almost to Florence, on the Tennessee River, which may represent the northwestern point of our boundary.

These limits are necessarily imperfect, but nevertheless include at least three-fourths of our species within an area of three hundred miles extent, either north and south, or east and west.

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* As the localities of nearly all of these are "Tennessee" or "Alabama," the most of *them* also were probably obtained from the Tennessee and Coosa Rivers.

Of course, where the rivers alone form the bounderies, many of their species have spread into the adjacent streams; but in East Tennessee, Southwest Virginia, West North Carolina and Northwest Georgia, where several parallel mountain ranges completely enclose the valleys of the rivers, almost all the species inhabiting them appear to be confined within their limits. And here, a space of one hundred and fifty miles in length, by fifty in breadth, will cover the territory occupied by probably more than a hundred and fifty species of *Strepomatidæ.*

The following table, representing the arrangement of the *Strepomatidæ* followed in my "Synonymy" of the species, published in the Proceedings of the Academy of Natural Sciences, 1863–4, will show both the *total* number of species, and the absolute and relative strength of the genera. A few species since published have not all been included, as we are not sufficiently well acquainted with them :—

NUMBER OF SPECIES OF STREPOMATIDÆ.

1. *Trypanostomoid Section.*

IO,		5
smooth,	2	
spinose,	3	
PLEUROCERA,		84
tuberculate,	7	
sulcate,	8	
striate, angulate,	12	
carinate,	8	
plicate,	2	
smooth, angulate,	15	
" not "	32	
ANGITREMA,		12
with a coronal of tubercles,	4	
with two rows of tubercles,	1	
with a central row of tubercles,	7	
LITHASIA,		17
large, oval, inflated,	5	
small, compact,	7	
obliquely flattened,	2	
subcylindrical,	3	
STREPHOBASIS,		8
ovate conical,	3	
cylindrical,	5	

2. *Goniobasic Section.*

EURYCÆLON,		6
GONIOBASIS,		274
spirally ridged,	1	
tuberculate,	18	
plicate,	85	
angulate,	16	
bi-multi-angulate,	11	
carinate,	4	
smooth, short,	26	
" elevated,	43	
striate "	8	
compact, ponderous,	62	
SCHIZOSTOMA,		26
fissure narrow,	14	
fissure wide,	12	
MESESCHIZA,		1

Third Section.

ANCULOSA,		31
nodulous,	1	
sulcate,	2	
striate,	3	
angulate,	4	
subglobose, or campanulate,	21	

Total in 1st section - - -	126 species,	464 species in all.
" 2d " - - -	307 "	
" 3d " - - -	31 "	

We find that, while some groups of species extend over a very wide territorial space, other groups are extremely restricted, and yet are frequently characterized by as great variation in form, size, ornamentation, &c., as the former. The *Goniobasic Group* occupy the entire extent of our country, represented by the sole species of our Northern Atlantic States, the very few forms of the great Northern Lakes and the species of the Pacific States, while they also occupy the entire southern country, with one or two species in Mexico and Cuba.

The *Trypanostomoid Section*, on the contrary, is very much more restricted, being confined principally to the streams tributary to the Mississippi and the Gulf of Mexico. The Mississippi appears to form their western boundary.

While the *Trypanostomoid* forms attain their maximum development in size and number in the Tennessee River, they are, to a very great extent, replaced by the *Goniobasic* forms in the Coosa River, which is undoubtedly the metropolis of the latter. The most striking genus of each of these groups is absolutely confined to the respective streams in which the groups had their origin. Thus, *Io* and *Schizostoma* are inhabitants, the first of the Tennessee and branches, the second of the Coosa, and neither of them are elsewhere found.

Assuming the Ohio River as a dividing line, we find that ninety-five per cent. of all the species originate south of it. Even a smaller proportion inhabit the rivers east of the Allegheny, and west of the Rocky Mountains. In the west, no species of *Strepomatidæ* have been discovered in higher latitudes than the northern boundary of the United States, while in the east, the St. Lawrence River and tributaries, appears to be the northern limit of the family.

We thus find the *Strepomatidæ* to be distributed almost exclusively within the limits of the United States, a distribution co-extensive with our *Viviparidæ* and other families of Mollusca; clearly indicating that our country constitutes a distinct faunal province. For, as the *Viviparidæ* are replaced in Mexico by *Ampullaria*, so, for the *Strepomatidæ*, are substituted the more ponderous *Pachycheili*. Between the former and the latter extend the broad plains of Texas, with rivers devoid of species, forming a barrier to the intermingling of the two groups. Besides this, the Mississippi River, from the junction of the Ohio to its mouth, appears to have formed a barrier to the westward progression of the *Strepomatidæ*, which but very few species have been able to surmount. We believe that one species only,—the *Goniobasis sordida*, of Lea,—is common to *both* sides of that great stream, while several forms, all of *Goniobasis*, are found inhabiting the western tributary streams exclusively.

Of course, our great river does not interpose such a formidable barrier in the northwest, where its volume is much less, and we here find the species of the great lakes not only inhabiting its waters in abundance, but extending into its western branches.

The species of the great lakes, though few in number and small in size, are very numerous in individuals, yet they fade out as completely on approaching the Ohio River as do the southern species; we are, therefore, compelled to admit in this case the plausibility of the theory of a separate creation of a small group of species, adapted to withstand the rigors of a climate which effectually forbids the introduction of the meridional species.

We may discover in the paucity of species, their small size and scant ornamentation, but multiplicity of individuals, and in their very extended distribution, a striking parallelism with the distribution of boreal marine Mollusca. Like the *Unionidæ*, the *Viviparidæ*, the *Amnicolidæ* and the *Limnæidæ*, of the same latidudes, the inter-communication afforded by our waters has induced the plentiful distribution of the same species from Iowa and Wisconsin to Western New York, and even into Lake Champlain.

We have already alluded to the total separation of the species of our West Coast States. The barrier of the Rocky Mountains has, of course, proved with them even a greater obstacle than with our *Helices*. We find, accordingly, that the few species (all *Goniobases*) mostly partake of two common type characters, being either plicately ribbed* or spirally striated. The *Strepomatidæ* are entirely absent from the waters of the New England States, the exclusion being due probably not only to the severe climate, for they inhabit streams in even higher latitudes, but probably also to their proximity to the sea. There is no *natural* method by which the species of the lakes could extend into the head waters of the New England rivers, and none of the species have as yet been transported by accident across the intervening land.

That the proximity of the sea exercises a great disturbing influence on the very few species which are exposed to and able to endure it, is proved by the great mutations of form which characterize *Gon. Virginica* and *Anc. dissimilis* in the Atlantic, and *Gon. plicifera* in the Pacific States.

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* Which, strangely enough, equally characterizes a group of *Goniobases* of East Tennessee. Our West Coast Helices are all of different species and generally of quite distinct groups; *Vivipara* is excluded, and the *Amnicolidæ* belong to different genera from those of the Atlantic States, yet the same species of *Physa*, *Lymnæa* and *Planorbis*, abound equally in either section !

The very great influence which our two great chains of mountains has exercised, in restricting the distribution of our species, may be inferred from what has already been said, and requires no further allusion.

The following observations on the geographical distribution of the various genera and smaller groups. will exhibit some very curious facts.

IO.

Of this genus, the type of the *Trypanostomoid* form, there are five species, two of which are smooth and three spinose: they are of extremely localized distribution, being confined to the head waters and tributaries of the Tennessee River. and principally to the Holston, in Southern West Virginia and East Tennessee. They are very numerous in individuals, as Mr. Anthony, during a visit made to this region several years ago, selected and brought home several thousand specimens. Prof. Haldeman also was very successful in collecting them.

PLEUROCERA.

Of the eighty-four species, only thirteen are found so far northward as the Ohio River, and only five of them originate in that stream or its northern tributaries. The Tennessee River and branches claims thirty-three species, of which twenty-one appear to be confined to its waters. The Cumberland River contains four species identical with those of the Tennessee, and about a dozen that are not found in the latter stream. The Alabama River contains fourteen species, three of which seem to be peculiar to it. These species are generally confined, however, to those portions of the Coosa and branches that approach to East Tennessee. A few species also inhabit the Tombigbee, of Mississippi.

About a dozen species have the simple habitat "Tennessee" stated; nine have "Alabama," and two "South Carolina." I doubt very much whether the latter is correct.

There is very good reason to believe that *all* the large tuberculate, sulcate and angulate species inhabit the Tennessee River, the most ponderous ones extending from the Coosa. through middle and west Tennessee, to the Ohio River. Among the angulate forms two, *trivittatum* and *tortum*, are reported only from the Tombigbee and Chattahoochee Rivers respectively. None of the carinate group—inhabitants of Tennessee River—extend northward to the Ohio, but, strangely enough, the North-western States furnish two peculiar species,—*P. subulare* of Niagara River, and *P. Lewisii* of Illinois River.

But two plicate *Pleurocerœ* have yet been discovered, although this form is so very common to the *Goniobases* inhabiting the same region. These shells are found in the Clinch and Cumberland Rivers.

Of the smooth species, several extend to the Ohio River.

ANGITREMA.

The four species of the first group are inhabitants of the Tennessee River. *A. salebrosa* has been gathered in the Holston, in East Tennessee, and in the Tennessee at Florence, Alabama.

A. Jayana inhabits Cany Fork, Tennessee.

The five species of the third group are, with the exception of *A. rota*, very closely allied.

A. armigera enjoys an extensive distribution. It was described from the Ohio River, and has since been found in the Wabash, Indiana, along with several other nodulous and plicate species, whose range is otherwise confined to more southern rivers. Kentucky and Tennessee are also given as habitats for this species; and in the latter State it doubtless originated. *A. Duttoniana* and *Stygia* are both reported from Cumberland River, and the former inhabits the Tennessee. The fourth group contains two species not easily distinguished, but differing very much in their range of habitat; for, while *A. lima* is confined to the *lower* waters of the Tennessee, *A. verrucosa* has a range co-extensive with that of *armigera*. It occurs in the Holston River and the whole extent of the Tennessee, the Cumberland, the lower parts of the Ohio, and is very plentiful in the Wabash.

LITHASIA.

While the *Angitremœ* are essentially a Tennessee group, the subgenus *Lithasia* partakes of both characters. Its large inflated species, five in number, all occur in the Tennessee River at Florence, Alabama, and vicinity, while the more numerous, compact, heavy species, approaching in form to the typical *Goniobases*, are almost confined to the Coosa and Cahawba Rivers. The exceptions are a small group of three species, of which *obovata* is the type, which inhabit the Ohio River and its Kentucky and Indiana tributaries, and one singular subcylindrical species reported from the Cumberland.

Mr. Anthony assigns Tennessee as the habitat of his *nucleola;* but I think he is mistaken, as I have specimens from the Coosa.

STREPHOBASIS.

Several of the species are reported only from East Tennessee, while two of them occur in the branches of the Alabama River. One of these is found in both rivers. Prof. Haldeman is in error in assigning Ohio River as the habitat of his *St. curta.* It has never been found there, but is one of the most plentiful shells of the Tennessee River, and as such, is in all our cabinets.

Goniobasic Section.

These shells constitute three-fifths of the species of *Strepomatidæ.* They are naturally divided into two type forms: the first, heavy, compact, with large subcylindrical body and short spire, is eminently characteristic of the Coosa River; while the second, containing narrow, elongated species, with high spires of many whorls, although more extensively distributed, is still very characteristic of the waters of the Tennessee River and branches.

To the first of these forms undoubtedly belongs *Eurycælon,* a new genus, which probably includes more species than have yet been assigned to it;--and *Schizostoma.* Of the six species of the former, one is from the Holston, another from the Cumberland, and the balance from the tributaries of the Alabama River.

SCHIZOSTOMA.

This genus, embracing twenty-six species, divided into two distinct groups of nearly equal respective numbers, inhabits the Coosa River only, and in this limited space exhibits all the range of variation in form, size and ornamentation, belonging to genera which possess a more extended geographical distribution.

MESESCHIZA

Contains at present only the type species. It is a very small, fragile shell, inhabiting the Wabash River, and does not appear to be of mature growth.

GONIOBASIS.

This very large and widely-extended genus embraces over two hundred and fifty species,—more than half of all the *Strepomatidæ,*—and includes the only representatives of the family west of the Rocky Mountains, or south of the United States.

One species, beautifully ridged with sharp, revolving ribs,—the *G. proscissa,* of Anthony,—is reported simply from northern Alabama. There are eighteen tuberculate species; the heavy, compact ones being principally from the branches of Alabama River, while the elongate ones are found in the Tennessee.

In the latter are included a very distinct group, typified by *Postellii*, of Lea, belonging to the tributaries of the Tennessee, in Northwest Georgia. Two or three allied species are found in Florida.

Among the tuberculate species, I have included *G. occata*, Hinds,—a California shell, of very doubtful generic character.

The plicate species number eighty-five, of which about half inhabit the Tennessee River. A few of these extend into the Cumberland, and one or two to the Green River, of Kentucky.

On the other side, a very few (five only) of the plicate species are found also in the Coosa and Black Warrior Rivers. Five species occur in Oregon and California. One species is reported from South Carolina, and two from Florida. The Ohio and Illinois Rivers each possess a species; and several occur in the Flint and Savannah Rivers, of Georgia.

G. suturalis, Haldeman, reported from Ohio, is more likely a Georgia species, identical with one recently described by Mr. Lea.

Twenty-seven angulate species are about equally distributed in the Coosa and Tennessee Rivers. One of them, *sordida*, Lea, occurs both in the Cumberland and in Saline River, Arkansas.

G. Potosiensis, Lea, is found in St. Francis River, Mo.

G. proxima, Say, occurs in the Holston and Santee Rivers.

G. bicincta, Anth., inhabits the Cahawba, Chattahoochee, Savannah, Roanoke, and is also reported from North Carolina and Arkansas!

Mr. Anthony's habitat, "Ohio," for his *G. tecta* is an error; the shell is known to come from the Coosa River.

It is also very doubtful whether the specimens of Mr. Lea's *G. Spartanburgensis*, from the Ohio River and from South Carolina, really belong to the same species. In such cases the authority for the alleged habitats should be rigorously investigated.

Of the twenty-six short, clavate, smooth species, a small group, with dark-colored, inflated shells, are quite characteristic of E. Tennessee and southern W. Virginia. Five species are found in the Ohio River and the Lakes, and two, both of which will probably be found to be sometimes plicate, occur in the rivers of the Pacific States.

There are forty-three smooth, elevated *Goniobases*, of which about one-fourth inhabit the Tennessee, and the same number the Alabama River. Seven or eight occur in the Ohio River and Great Lakes, and two are found in California.

Three species inhabit Louisiana, and are the only *Strepomatidæ* reported from that State. Neither of them occur east of the Mississippi.

G. semicarinata, one of the species of this division, extends from Tennessee and Kentucky, throughout all the Western States and the Lakes, and rejoices in twelve synonyms!

There are eight striate species, of which one, *G. Virginica*, Say, is the only *Goniobasis* inhabiting the rivers of New York, Pennsylvania and Maryland. Through the Erie canal it is extending to the Western Lakes.*

Very close relatives to this shell are *latitans*, Anth., and *sulcosa*, Lea, the former from Green River, Ky., and the latter from Tennessee.

There are over sixty species in the group which I have designated as "compact, ponderous," for want of a better name. They are essentially a distinct group from the other *Goniobases*, and *all the species, except three, are peculiar to the branches of the Alabama River.*

ANCULOSA.

Thirteen species inhabit the Coosa River, three of which are common to the Tennessee, and one of them, *A. prærosa*, extends northward to the Ohio. Two others are peculiar to the Tennessee. Three species are found in the Dan, Roanoke and Tar Rivers.

A peculiar group of shells, possessing an inflated form and much lighter texture, are found in the Potomac and Susquehannah Rivers, the Kanawha and the upper Ohio. They are—*A. dissimilis, dilatata, costata* and *trilineata.*

Concluding Observations.

In studying the species of *Strepomatidæ*, especial care must be taken not to consider young shells to be adult species. All of our conchologists who have described species of this family have fallen into this error. The aspects assumed by young or half-grown shells, are frequently so very different from their appearance when mature, as to be liable to mislead experienced naturalists.

All quite young shells are characterized by a thin texture, very light color, and very sharp, acuminated spire, and in most cases by the base of the aperture being acuminate also.

Nearly every species, even when smooth, in its adult state, presents the first few spires either sharply carinate, or plicate, or striate. Occasionally they are either one or the other *in the same species.* Hence, in describing shells as carinate, or plicate, or angulate, the appearance presented by the adult only, should be thus described.

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* *Vide* Dr. James Lewis, Proc. Acad. Nat. Sci.

In some of the species, however, these lines, plicæ or carinæ, are persistent in the old shell, under favorable circumstances, but in most specimens are not seen. This is *one* difficulty which has caused the multiplication of synonymic names, generally unavoidably, on account of the scarcity of specimens, known to be from the same locality, for comparison.

When a specimen exhibits a perfect spire in the adult state, (rare among the *Strepomatidæ*,) and the initial whorls are plicate or carinate, they cannot be regarded as affording reliable data for specific discrimination. And it is only when these marks extend quite, or more than half way to the body whorl, that the species should be regarded as plicate or carinate. Whether species not usually *plicate* do not in some localities *become so*, from the absence of disturbing influences of the waters, is a question that we cannot as yet definitely decide; its decision in favor of such occasional development of plicæ would effect the validity of many species which are now regarded as established.

The development of carinæ or tubercles on the body whorl of the adult shells is not nearly so constant a character as would, at first sight, appear to be the case, and several species are in doubt on this account. *Generally,* however, these may be regarded as more permanent characters when developed on the body than on the spire, as an *adult* shell is not subject to the same mutations of form as a juvenile individual.

Of course, the relations of size and texture are applicable to adults only; and *then* the former is subject to much variation from external influences. Texture is an important, because a tolerably permanent, discriminative guide.

Color, external or internal, generally, should not be much relied on, nor the presence or absence of bands, or maculations; but in exceptional cases it is *very* characteristic, as in *P. viridulum,* Anth., for instance. Perhaps color in the *interior* is a more reliable feature than epidermal or *external* hues.

In *some* species, however, the presence or absence of bands forms a prominent distinctive feature.

Form, though subject to variation, may be relied on as one of the best characteristics; the length, number, and the convexity of the whorls, relative size of the aperture to that of the entire shell, shape of the outer lip and of the columella, are all *generally* reliable.

To repeat; in distinguishing a species of *Strepomatidæ*, of course the first step is to ascertain whether it is *adult.* The signs of juvenility are—sharp extremities, thin texture, *par-*

ticularly the outer lip, which is frequently, on this account, broken, the very light color in the quite young, and the absence of callosity upon the columella.

A comparison of shape, angle of divergence of the whorls, &c., with specimens of adult shells, or with figures and descriptions, will generally suffice to detect half-grown shells.

Many of the ponderous Alabama *Goniobases* are *bulbous* in the half-grown state; the spire at first narrowly acuminate, then suddenly and very convexly expanding, resembling the growth of certain West India *Cylindrellæ.* As with these terrestrials, the subulate portion invariably disappears in the adult, leaving a somewhat papæform shell.

We thus find that no one character (with very few exceptions) can be relied on in specific discrimination, but rather a *combination* of characters, with a general idea of the necessary allowance for variation pervading other species of the same general type, or contiguous locality.

DESCRIPTION OF TWO NEW SPECIES OF HELIX.

BY A. D. BROWN.

1. Helix Liberiæ, nob.

Description.—T. perforatâ, elevatâ, tenue, diaphanâ, pallide corneâ, superne striatâ, subtus leve, carinatâ; spirâ elevatâ; anfr. 7 superne planiusculis, subtus convexioribus, subexsertis, ultimo non descendente; aperturâ vix obliquâ, angulato-lunare; perist. simplice, margine umbilicare reflexo.

Diam. maj. 18, min. 16, alt. 7 mill.

Habitat.—Cape Palmas, Liberia.

Shell perforate, elevated, thin, diaphanous, pale horn-color, above striated, beneath smooth, carinated; spire elevated; whorls 7, above rather flat, below more convex, subexserted, the last not descending; aperture slightly oblique, lunately angled; peristome simple, with the umbilical margin reflected.

Bears some resemblance to *H. pellucida,* Gld., but is smaller, more coarsely striated, and much more acutely carinated. The umbilicus is also much smaller, and the spire more elevated.

2. Helix Africæ, nob.

Description.—T. perforatâ, tenue, superne convexiusculâ, subtus convexâ, diaphanâ, corneâ, costatâ; spirâ subelevatâ; anfr. 5½ convexiusculis, sensim accrescentis, ultimo non descendente, subcarinatâ; aperturâ vix obliquâ, lunare; perist. superne breviter reflexo, ad umbilicum late reflexo.

Diam. maj. 8, min. 7, alt. 5 mill.

Habitat.—Great Brakke, South Africa.

Shell perforate, thin, above slightly convex, below convex, diaphanous, horn-color, costate; spire somewhat elevated; whorls 5½, slightly convex, gradually increasing, the last not descending, subcarinated; aperture slightly oblique, lunate; peristome above slightly reflected; at the umbilicus widely reflected.

Resembles *H. Planti,* Pfr., but differs from it in being smaller, more elevated, more acutely carinated, in the coarser striæ, and in the absence of the short hairs occurring in that species.

Not from Enterprise, but from
the Jackson formation at Garland
Creek, 3 miles east of Shubuta.
(See Alrdich, A. J. S., v. 30,
p. 307, 1885.

DESCRIPTIONS OF NEW EOCENE SHELLS FROM ENTERPRISE, MISSISSIPPI.

BY T. A. CONRAD.

Dr. William Spillman, who formerly resided in Columbus, Miss., has forwarded to the Academy of Natural Sciences of Philadelphia, many new Cretaceous and Eocene fossils, among which I find a series collected at Enterprise, Clarke Co., Miss., all of which are new, and distinct from those of any other locality from which fossils have been sent to the Academy. The group, I presume, is more nearly synchronous with that of Claiborne than with the Jackson group.

CORBULA, Lam.

C. FILOSA, nob.—pl. 10, fig. 7.

Description.—Subtriangular, subequilateral; umbonal slope carinated and submarginal; surface striated with fine imbricated lines.

One valve only is in the collection, (the larger valve,) and is very distinct from the other American Eocene species.

DIONE, Gray.

D. SECURIFORMIS, nob.—pl. 10, fig. 1.

Description.—Subcordate, ventricose, with concentric recurved ribs; anterior margin acutely rounded; posterior extremity subtruncated; lunule cordate, defined by a slightly impressed line; right valve—cardinal teeth approximate, curved, direct.

D. ANNEXA, nob.—pl. 10, fig. 5.

Description.—Ovate, convex; posteriorly cuneate, abruptly rounded at the extremity; substance thick; anterior side short, obtusely rounded; ventral margin rounded; umbo broad; anterior cardinal tooth robust in the left valve, pyramidal.

One valve only is in the collection, and is water-worn, but otherwise entire. It differs from *D. perovata* in being a smaller species, less in diameter through the umbones, and less produced posteriorly. It has some resemblance to *D. silicea*, C., but is shorter anteriorly, and proportionally longer in outline.

TELLINA, Lin.

SUBGENUS, ANGULUS, Muhlfeldt.

T. EBURNEOPSIS, nob.—pl. 10, fig. 17.

Description.—Subovate, inequilateral, thin in substance, compressed, white, polished; apex slightly prominent, acute, fold submarginal, distinct; anterior margin regularly rounded; posterior margin very oblique, subtruncated at the end, and angular at tip.

One right valve only, in the collection, very distinct from any other fossil species I have seen from the American Tertiaries.

T. ALBARIA, nob.—pl. 11, fig. 7.

Description.—Oblong, inequilateral, thin in substance, compressed, white, with traces of one or two concentric bands; fold obsolete.

One left valve, very distinct from the preceding, or any other American species known to me.

SUBGENUS, TELLINELLA, Gray.

T. LINIFERA, nob.—pl. 10, figs. 16, 18.

Description.—Oblong; fold distinct, but not profound; concentric lines acute anteriorly, and angulated over the fold.

Two left valves, imperfect, the outlines of which have been restored in the figures. The outline of fig. 18 is incorrectly drawn; it should be nearer the proportions of fig. 16.

ALVEINUS, Conrad.

Description.—Equivalved, smooth; anterior, posterior and ventral margins channelled within; hinge of right valve emarginate under the apex, and having one pyramidal tooth anteriorly; hinge of left valve with a pit under the apex, and two compressed diverging teeth anteriorly; pallial line entire?

A. MINUTA, nob.—pl. 10, fig. 2.

Description.—Suboval or suborbicular, very inequilateral, convex, smooth and shining; margins rounded.

This is a minute shell, much enlarged in the figure, and common in the small quantity of marl which accompanies the specimens. The family to which it should be referred is undetermined. A microscopic channel margins the valves within.

SPHÆRELLA, Conrad.

S. BULLA, nob.—pl. 10, fig. 9.

Description.—Equilateral, orbicular, subspheroidal; surface with distant, shallow, concentric furrows, or undulations.

CYCLAS, Klein.

C. CURTA, nob.

Description.—Equilateral, suborbicular, ventricose, concentrically finely striated; posterior end truncated, direct; dorsal margins each with two or three pointed tubercles; beaks slightly prominent, acute.

Length $\frac{3}{8}$ inch; height the same.

PROTOCARDIA, Beyrich.

P. LIMA, nob.—pl. 10, fig. 3.

Description.—Subtriangular, inequilateral, length greater than the height, ventricose, minutely radiated; posterior margin obliquely truncated, extremity much above the line of the base, obtusely rounded; umbo rather narrow; post-umbonal slope densely radiated and tuberculated.

Nearest in outline to *P. diversa,* Conrad; but that species is smooth on the post-umbonal slope.

CRASSATELLA, Lam.

C. PRODUCTA, nob.—pl. 10, fig. 6. Proc. A. N. Sci., 1862, p. 289.

GOULDIA, Adams.

G. PYGMÆA, nob.

Description.—Triangular, equilateral, with eight distinct concentric ribs; posterior hinge-margin very slightly curved, the anterior straight, but slightly angular at the umbo; anterior extremity angular and situated medially to the height of the valves.

AXINÆA, Poli.

A. INEQUISTRIA, nob.—pl. 10, fig. 12.

Description. — Suborbicular, slightly oblique, moderately ventricose, radiating striæ, coarse, unequal towards the ends; within, the marginal teeth are concave or channelled.

A. DUPLISTRIA, nob.—pl. 10, fig. 19.

Description.—Subcircular, longer than high; ventricose, subequilateral, not oblique; radii closely arranged, double or grooved in the middle, except towards the ends; within, the marginal teeth small and closely arranged.

NUCULANA, Link.

N. LINIFERA, nob.—pl. 10, fig. 8.

Description.—Elliptical, ventricose, equilateral, concentrically ribbed; ribs obsolete posteriorly, and remote; each side has a slight furrow or fold radiating from the beak; anterior extremity acute; ventral margin rounded.

This small species is very perfect, with both valves connected. The figure is much enlarged.

NUCULA, Lam.

N. SPHENIOPSIS, nob.—pl. 10, fig. 13.

Description.—Obliquely ovate-triangular, slightly ventricose; posterior side cuneiform, extremity acutely rounded; inner margin minutely crenulated.

ARCOPERNA, Conrad.

Description.—Oval or oblong, inflated; beaks terminal; hinge edentulous; ligament internal; muscular impressions marginal.

A. FILOSA, nob.—pl. 10, fig. 14.

Description.—Suboval, inflated, thin, pearly; radiated with minute, closely-arranged lines; disk somewhat flattened behind the umbonal slope; posterior margin subtruncated above, extremity rounded; basal margin rounded posteriorly; beak terminal.

This genus appears to me quite distinct from *Modiola*, and is characteristic of the Eocene period. *M. radiolata*, Desh., is congeneric, and the peculiarities of the species described by Deshayes are, I think, of generic value.

PECTEN, Lin.

SUBGENUS EBURNEOPECTEN, Conrad.

Description. — Smooth, polished, thin, of an ivory-like substance.

This subgenus is common in Eocene strata, but I have not met with it in later formations.

P. SCINTILLATUS, nob.—pl. 10, fig. 4.

Description.—Ovate, very thin in substance; umbo ventricose, narrow, apex acute; anteriorly the larger valve is marked with minute fine lines, having a shagreen-like character.

The smaller valve of this species is unknown.

OSTREA, Lin.

O. FALCIFORMIS, nob.—pl. 11, fig. 1.

Description.—Subfalcate; larger valve, with divaricating, prominent ribs; posterior submargin depressed, and finely ribbed; upper valve convex, without ribs.

A variety of this species has very numerous narrow ribs, about forty-four in number; but the specimen figured has not more than thirty-four, and is of a much broader form. It is nearly allied to *O. submissa*, Deshayes.

DOLIOPSIS.

D. QUINQUECOSTA, nob.—pl. 10, fig. 15.

Description. — Subglobose, slightly beaked; body whorl ornamented with five distant, acutely angular, revolving ribs, the inferior rib smallest and approximate; spire short, whorls angular at the top and flattened; aperture narrow; beak sinuous.

TURRITELLA, Lam.

T. PERDITA, nob.—pl. 10, fig. 10.

Description.—Broad at base; volutions thirteen or fourteen, laterally flattened, and having five prominent revolving lines on each, with an intermediate fine line; the two inferior volutions of the spire slightly projecting near the base; body volution angulated; base finely striated; lines on the volutions, towards the apex, crenulated.

MESALIA, Gray.

M? ARENICOLA, nob.—pl. 10, fig. 11.

Description.—Volutions thirteen? convex, penultimate, and two contiguous volutions, each with seven acute, prominent, revolving lines; the two inferior lines remote, and the third more prominent and distant than the remainder; towards the apex this line is not more prominent than those above it, but the second becomes large and carinates the volutions, giving them an angular appearance; one, and occasionally two, very fine lines alternate with the others.

DESCRIPTIONS OF NEW EOCENE SHELLS OF THE UNITED STATES.

BY T. A. CONRAD.

STREPSIDURA, Swainson.

S. LINTEA, nob. pl. 20 fig. 1

Description.—Ovate-acute; spire scalariform, consisting of five angular volutions; striæ rugose, prominent and coarse below the angle of the volutions and body whorl, fine on the space above; longitudinal ribs acute, prominent, distant, obsolete or wanting on the back of the body whorl; beak very short, recurved.

Length ¾ inch.

Locality.—Claiborne, Alabama.

SURCULA, Adams.

S. GABBII, nob.—pl. 11, fig. 5.

Description.—Fusiform; volutions eight or nine, convex and subangulated beneath and indented above, with fine revolving lines, the indented space angular above, between which angle and the suture the striæ are largest; this indentation has minute, very close-arranged revolving lines; body volution with numerous rugose alternated lines, obsolete on the upper part of the volution; beak long and straight.

Locality.—Texas.

S. LINTEA, nob.

Description.—Turrited; volutions ten. subangulated submedially, with a prominent revolving line on the angle; lower half of volutions salient and obscurely costate; revolving wrinkled lines on all the whorls, except three, from the apex; five of these on the penultimate volution below the prominent line on the angle, which is situated above the middle of each volution; body whorl obscurely costate on the shoulder, and having revolving, unequal lines nearly to the extremity of the beak; lines about eighteen in number below the summit of the aperture.

Locality.—Claiborne. ?

COCHLESPIRA, Conrad.

C. ENGONATA, nob. p. 21 fig. 6.

Description.—Fusiform; spire elevated, whorls seven, terebriform, with minute, wrinkled, revolving lines, obsolete above the angle, which is carinated and obscurely crenulated; beak produced, reflected at the end.

Length $1\frac{1}{8}$ inch.

Locality.—Claiborne and Texas.

MONILIOPSIS, Conrad.

Description.—Turrited, cancellated; fissure of labrum shallow; beak very short.

M. ELABORATA, (*Pleurot.*,) nob.

This beautiful shell does not agree in generic character with other *Pleurotomidæ*, but it forms a connecting link between the shells with a smooth or entire columella and the plaited genera *Scobinella*, and *Borsonia.*

DRILLIA, Gray.

D. TEXANA, nob.

Description.—Turrited, whorls seven, polished, longitudinally costate; ribs prominent, rather distant; suture profoundly carinated; deposit on labium thick and broad; beak very short.

Locality—Wheelock, Texas.

TORTOLIVA, Conrad.

Description.—Subcylindrical, or subovate; spire short, obtuse; aperture elongated, effuse at base; columella callous, with an impressed, oblique fold.

T. TEXANA, nob.

Description.—Ancilliform, smooth; spire papilliform, and consisting of two volutions; an impressed, sinuous line extends along the body near the columella, beneath which an oblique impressed is continued from the columellar fold.

Length $\frac{1}{2}$ inch.

MONOPTYGMA, Lea.

M. CURTA, nob.—pl. 11, fig. 8.

Description. — Subelliptical; spire short, the volutions slightly convex, indented at the suture; body volution ventricose, abruptly rounded above, near the suture; aperture patulous; columella with a prominent acute fold, and tortuous and obtusely carinated towards the base; basal margin wide.

Locality.—Claiborne, Alabama.

VOLUTILITHES, Swainson.

V. INDENTA, nob.

Description.—Subfusiform; spire elevated; volutions scalariform, and ridged below the suture, longitudinally costate; body whorl ribs acute; revolving, attenuated striæ from the upper angle to the base; area above the angle concave; striæ obsolete; columella with two equal, acute, oblique plaits.

Length ½ inch.

V. IMPRESSA, nob.

Description.—Fusiform; volutions seven, concave above, with a revolving ridge at the suture: inferiorly ribbed; ribs subspinous at the angle; body whorl with prominent, compressed spines on the angle, capping the ribs; revolving lines impressed; columella with two slender prominent, nearly equal plaits.

Length 1¼ inch.

Locality.—Texas.

OBELISCUS, Humphrey.

O. PEREXILIS, nob.

Description—Subulate, polished; volutions fourteen; sides straight above and rounded at base; suture deeply channelled; body whorl with slightly concave sides; columella with a prominent plait uniting with the labial deposit.

ARCHITECTONICA, Bolten.

A. CÆLATURA, nob.—pl. 11, fig. 13.

Description.—Depressed, with minute beaded, or tuberculated, revolving lines, and a larger line near the base of each volution, and one near the suture above, smaller than the former, but more distinct than the finer lines beneath; periphery carinated; base finely striated and tuberculated, with two distant larger lines; submargin of umbilicus grooved; umbilicus small, edge crenate.

Locality.—Claiborne, Alabama.

BULIMUS.

B. FLORIDANUS, nob.—pl. 11, fig. 11.

Enlarged figure of fossil described by me in the Amer. Jour. of Science, (*Eulima Floridana,* D'Orbigny.) The tertiary limestone in which it was found, is supposed to be an Eocene rock.

CANCELLARIA, Lam.

C. LIRATA, nob.—pl. 11, fig. 3.

Description.—Fusiform, volutions five, angular at the summit; spire scalariform; ribs longitudinal, compressed and acute; summit or upper area of body whorl slightly concave, and the ribs prominent or subspiniform at the angle; a few distant obsolete revolving lines towards the base; umbilicus small, profound.

Length, $\frac{1}{4}$ inch.

This small species (enlarged in the figure) is probably from Texas.

C. IMPRESSA, nob.—pl. 11, fig. 16.

Description.—Elongated, acutely ovate, volutions seven, angular, and flattened above; ribs longitudinal, acute, subspiniform at the summit angle; body whorl slightly carinated at the angle, with only one or two ribs; umbilicus wide, carinated on the margin; labrum finely striate within; labium reflexed; base subacute.

Locality.—Claiborne, Alabama.

C. TORTIPLICA, nob.

Description.—Subfusiform, with longitudinal narrow ribs and a few thick varices; volutions six, those of the spire convex; regular, prominent revolving lines, six in number, on the penultimate volution, eighteen or nineteen on the body whorl, fine, and crowded near the suture and base; labrum striate within; columella with three sinuous plaits, the upper one large and thick.

Length $\frac{3}{8}$ inch.

Locality.—Texas.

TORNATELLÆA, Conrad.

T. LATA, nob.

Description.—Subglobose, with numerous revolving lines; spire short, acute; aperture patulous; columella with two distant plaits.

Actæon latus, Conrad, Eocene Catalogue, p. 34.

Locality.—Alabama.

CORBULA, Lam.

C. FILOSA, nob.

Description.—Subtriangular, equilateral, length and height nearly equal; disk concentrically ribbed; ribs imbricated; posterior slope indented; extremity truncated.

Length $\frac{1}{4}$ inch.

Locality.—Vicksburg, Miss.

EGERIA, Lea.

E. DONACEA, nob.—pl. 11, fig. 12.

Description.—Triangular, donaciform, ventricose; posterior side short, subtruncated at the extremity; anterior dorsal margin slightly incurved; disks minutely radiated; umbo ventricose; inner margin crenulated.

Locality.—Claiborne, Alabama.

VENERIDÆ.

CYTHERIOPSIS, Conrad.

Description.—Triangular; hinge composed of two compressed or linear teeth under the apex, and two oblique teeth anterior to them; in the left valve are four diverging teeth, the posterior one linear; and a lateral pyramidal compressed tooth anteriorly; cartilage area rugose; pallial line with a shallow, rounded sinus.

C. HYDANA, Conrad.

This very distinct genus has been usually referred to *Grateloupia*, Desmoulins; but it has one more cardinal tooth in each valve, and a slight pallial sinus, which in *Grateloupia* is very profound. It is at present represented by this one species, and peculiar to the Eocene.

CYCLAS, Klein.

C. CLAIBORNENSIS, nob.

Description.—Suborbicular, compressed, inequilateral; beaks small and acute; disk with concentric, prominent, numerous lamelliform striæ; ligament margin straight, oblique; posterior end truncated, or slightly emarginate; ventral margin profoundly rounded.

Height 1½ inch. Length 1½ inch.

Locality.—Claiborne, Alabama.

This shell occurs in the group at the base of Claiborne Bluff, belonging to an older division of the Eocene than the Claiborne group above. The cardinal teeth are prominent, and the pits profound.

MYSIA, Leach.

M. ASTARTIFORMIS, nob.—t. 11, fig. 15.

Mysia Astartiformis, Conrad.—Jour. Acad. Nat. Sciences, 2d series, IV., p. 296.

M. LEVIS, nob.

Description.—Suborbicular, thin, convex, inequilateral; posterior margin subtruncated.

Sphærella levis, C.—Cat. of Eocene Shells in this Journal, Part 1, p. 9.

Locality.—Claiborne, Alabama.

It is smaller than *Diplodonta bidens*, Deshayes, but more nearly resembles it than any other species of the Paris Eocene.

M. DELTOIDEA, nob.—t. 11, fig. 10.

Description.—Subtriangular, ventricose, subequilateral; posterior margin obtusely rounded; anterior angular; extremity medial compared with the height; disk anteriorly concentrically striated, posteriorly smooth.

Locality.—Claiborne, Alabama.

NUCULANA, Link.

N. PROTEXTA, nob.—pl. 11, fig. 6.

Description.—Elongated, slightly ventricose, with closely-arranged, minute thread-like concentric lines, distinct and rugose on the anterior submargin, which is flattened, or broadly and slightly furrowed; upper margin oblique, medially rectilinear, reflexed at the end; posterior extremity above the middle and on a line with the anterior end; posterior ventral margin obliquely truncated.

Locality.—Alabama. Dr. Showalter.

ACTÆONEMA, Conrad.

Cælatura, Conrad.—Amer. Jour. Conch., No. 1, p. 35.

Description.—Conical; volutions numerous, sculptured as in the genus *Actæon*, Montfort; aperture suboval, acutely rounded and reflected at base; peristome not continuous.

This genus has some resemblance to *Aclis*, Loven, but the sculpture is the same as in *Actæon*, and the aperture like that of many species of *Melania*, Lam.

A. STRIATA.—t. 11, fig. 2.

Pasithea striata, Lea.—Contributions to Geology.

Description.—Volutions nine, each with four transversely-striated grooves, except the body whorl, which has twelve; base slightly umbilicated; labium grooved within.

CONUS, Lin.

C. ALVEATUS, nob.—t. 11, fig. 4.

Description. — Oblong-turbinate, thin in substance; sides straight below and slightly convex above; summit of body volution and each whorl of the spire profoundly carinated; spire very short, with a slightly concave outline; base with impressed revolving lines.

Locality—Vicksburg, Miss.

This species differs from the Eocene *sauridens*, in having a less elevated and a more profoundly carinated spire, and the revolving lines on the spire are less numerous than in the former.

C. SUBSAURIDENS, nob.—t. 11, fig. 9.

Description. — Elongately acutely conical, with straight sides, slightly curving towards the summit of body whorl; summit and spire sharply carinated; three volutions from the apex exserted.

Locality.—From the Burrstone, probably, of Alabama.

The specimen is silified. It differs from the preceding species in form, and the lower part has much finer, more equal, and more numerous revolving lines.

REFERENCE TO THE PLATES ILLUSTRATING MR. CONRAD'S DESCRIPTIONS OF EOCENE MOLLUSCA.

Plate 10.

Fig. 1. DIONE SECURIFORMIS, C.—P. 137.
" 2. ALVEINUS MINUTA, C.—P. 138.
" 3. PROTOCARDIA LIMA, C.—P. 139.
" 4. PECTEN SCINTILLATUS, C.—P. 140.
" 5. DIONE ANNEXA, C.—P. 137.
" 6. CRASSATELLA PRODUCTA, C.—P. 139.
" 7. CORBULA FILOSA, C.—P. 137.
" 8. NUCULANA LINIFERA, C.—P. 139.
" 9. SPHÆRELLA BULLA, C.—P. 138.
" 10. TURRITELLA PERDITA, C.—P. 141.
" 11. MESALIA? ARENICOLA, C.—P. 141.
" 12. AXINIA INEQUESTRIA, C.—P. 139.
" 13. NUCULA SPHENIOPSIS, C.—P. 140.
" 14. ARCOPERNA FILOSA, C.—P. 140.
" 15. DOLIOPSIS QUINQUECOSTA, C.—P. 141.
" 16. TELLINA LINIFERA, C.—P. 138.
" 17. " EBURNEOPSIS, C.—P. 138.
" 18. " LINIFERA, C.—P. 138.
" 19. AXINIA DUPLISTRIA, C.—P. 139.

Plate 11.

Fig. 1. OSTREA FALCIFORMIS, C.—P. 140.
" 2. ACTÆONEMA STRIATA, Lea, (sp.)—P. 147.
" 3. CANCELLARIA LIRATA, C.—P. 145.
" 4. CONUS ALVEATUS, C.—P. 148
" 5. SURCULA GABBII, C.—P. 142.
" 6. NUCULANA PROTEXTA, C.—P. 147.
" 7. TELLINA ALBARIA, C.—P. 138.
" 8. MONOPTYGMA CURTA, C.—P. 143.
" 9. CONUS SUBSAURIDENS, C.—P. 148.
" 10. MYSIA DELTOIDEA, C.—P. 147.
" 11. BULIMUS FLORIDANUS, C.—P. 144.
" 12. EGERIA DONACIA, C.—P. 146.
" 13. 14. ARCHITECTONICA CÆLATURA, C.—P. 144.
" 15. MYSIA ASTARTIFORMIS, C.—P. 148.
" 16. CANCELLARIA IMPRESSA, C.—P. 145.

CATALOGUE OF THE OLDER EOCENE SHELLS OF OREGON.

BY T. A. CONRAD.

The Fossil Shells of the United States Exploring Expedition, collected at Astoria, and published in Dana's Report on Geology and Palæontology, were referred by me to the Miocene period. A larger acquaintance with Tertiary Fossils in general, has led me to the conclusion, that their position is in the Older Eocene, and that they correspond in their horizon to the group of Shark River, Monmouth Co., New Jersey; holding, in common, the *Aturia ziczac.* The shells of Shark River being in the form of casts, not sufficiently characteristic for comparison with those of Oregon, the *Aturia* is the only species that is certainly common to the two localities, but several of the Oregon species are almost identical with shells of the London Clay of Bracklesham and Bognor. All the species in this catalogue contained in Dana's Report, are without other reference than page, plate and figure.

CEPHALOPODA.

ATURIA, Bronn.

A. ZICZAC, (*Nautilus,*) Sowerby.

Nautilus angustatus, Con.—P. 728, pl. 20, figs. 5, 6.

Pelagus Vanuxemi, Con.—Jour. Acad. Nat. Sci., i., 2d series, p. 130, t. 14, f. 5.

GASTEROPODA.

MURICIDÆ.

PRISCOFUSUS, Conrad.

P. CORPULENTUS (*Fusus,*) Con.—P. 728, pl. 20, fig. 4.

P. DEVINCTUS (*Buccinum?*) Con.—P. 728, pl. 20, fig. 2.

P. GENICULUS (*Fusus,*) Con.—P. 728, pl. 20, fig. 3.

P. MEDIALIS (*Cerithium?*) Con.—P. 728, pl. 20, fig. 1.

P. NODIFERUS, Con.—Pl. 20, fig. 12.

P. OREGONENSIS, Con.—Pl. 20, figs. 10, 11.

DOLIIDÆ.

DOLIOPSIS, Conrad.

D. PETROSUS (*Dolium,*) Con.—P. 727, pl. 19, figs. 3 and 5.

D. BILIRATUM (*Dolium petrosum,*) Con.—P. 727, pl. 19, fig. 4.

SYCOTYPHUS, Browne.

S. MODESTUS, Con.—Amer. Jour. Science, 1848, p. 433, fig. 12.
S. OREGONENSIS, (*Fusus*,) Con.—Amer. Jour. Science, 1848, p. 433, fig. 13.

VOLUTIDÆ.

VOLUTILITHES, Swains.

V? INDURATA (*Rostellaria*,) Con.—P. 727, pl. 19, fig. 12.

NATICIDÆ.

LUNATIA, Gray.

L. OREGONENSIS, Con.—Pl. 19, fig. 6, b, c.

NEVERITA, Risso.

N. SAXEA (*Natica*,) Con.—P. 727, pl. 19, fig. 7.

CATINUS, Klein.

C. SCOPULOSUS (*Sigaretus*,) Con.—P. 727, pl. 19, figs. 6 and 6 a.

CERITHIOPSIDÆ.

CERITHIOPSIS, Forbes and Hanley.

C.? OREGONENSIS, Con.—Pl. 20, figs. 13, 14.

CANCELLARIIDÆ.

CANCELLARIA, Lam.

C.? OREGONENSIS, Con.—Pl. 20, fig. 8.

CYLICHNIDÆ.

CYLICHNA, Loven.

C. OREGONA (*Bulla petrosa*,) Con.—P. 727, pl. 19, fig. 8.
C. PETROSA (*Bullina*,) Con.—Amer. Jour. Science, 1848, p. 433, fig. 11.

CALYPTRÆIDÆ.

CRYPTA, Humphrey.

C. PRÆRUPTA (*Crepidula*,) Con.—P. 727, pl. 19, figs. 9, 10.
C. ROSTRALIS, Con.—Pl. 19, fig. 11.

DENTALIIDÆ.

DENTALIUM, Lin.

D.? SUBSTRIATUM (*Teredo*,) Con.—P. 728, pl. 20, figs. 7 and 7 a.

CONCHIFERA.

SOLENIDÆ.

SOLENA, Browne.

S. PROTEXTA (*Donax?*) Con.—P. 723, pl. 17, fig. 9.

ENSIS, Schum.

E. CURTUS (*Solen,*) Con.—Amer. Jour. Science, 1848, p. 433, fig. 14.

SAXICAVIDÆ.

GLYCIMERIS, Klein.

G. ABRUPTA (*Panopæa,*) Con.—P. 723, pl. 17, fig. 5.

ANATINIDÆ.

THRACIA, Leach.

T.? TRAPEZOIDES, Con.—P. 723, pl. 17, fig. 6.

MACTRIDÆ.

MACTRA, Lin.

M. ALBARIA, Con.—Amer. Jour. Science, 1848, p. 432, fig. 4.

TELLINIDÆ.

TELLINA, Lin.

T. ALBARIA, Con.—P. 725, pl. 18, fig. 5.
T. ARCTATA, Con.—P. 725, pl. 18, fig. 3.
T. BITRUNCATA, Con.—P. 725.
T. EMACERATA, Con.—P. 725, pl. 18, fig. 4.
T.? OBRUTA, Con.—Amer. Jour. Science, 1848, p. 432, fig. 6.
T. OREGONENSIS, Con. " " " " " " fig. 5.
T. SUBNASUTA (*nasuta,*) Con.—P. 725.

VENERIDÆ.

VENUS, Lin.

V.? LAMELLIFERA.—P. 724, pl. 17, fig. 12.
V. SECURIS, Shumard.—Trans. St. Louis Acad., vol. i., p. 122.

DIONE, Gray.

D. ANGUSTIFRONS (*Venus,*) Con.—P. 724, pl. 17, fig. 11.
D. BREVILINEATA (*Venus,*) Con.—P. 724, pl. 17, fig. 13.
D. OREGONENSIS (*Cytherea,*) Con.—Amer. Jour. Science, 1848, p. 433, fig. 8.
D. VESPERTINA (*Cythrea,*) Con.—*Ibid.*, fig. 9.

CYPRINIDÆ.

CYPRINA, Lam.

C. BISECTA (*Venus.*)—P. 724, pl. 17, fig. 10; pl. 18, fig. 1?

CARDIIDÆ.

CARDIUM, Lin.

C. SUBTENTUM (*Cardita,*) Con.—P. 726, pl. 18, fig. 12.

LUCINIDÆ.

CYCLAS, Klein.

C. ACUTILINEATA (*Lucina,*) Con.—P. 723, pl. 18, fig. 2.
Pectunculus patulus? Con.—P. 726, pl. 18, fig. 8.
C. FIBROSA (*Lucina,*) Shumard.—Trans. St. Louis Acad., vol. i., p. 120.

SOLEMYADÆ.

SOLEMYA, Lam.

S. VENTRICOSA, Con—P. 723, pl. 17, figs. 7, 8.

UNGULINIDÆ.

MYSIA, Leach.

M. PARILIS (*Loripes,*) Con.—Amer. Jour. Science, 1848, p. 433, fig. 7.

ARCIDÆ.

ANOMALOCARDIA, Klein.

A.? DEVINCTA (*Arca,*) Con.—P. 726, pl. 18, fig. 10.

AXINÆIDÆ.

LIMOPSIS, Sassi.

L. NITENS (*Pectunculus,*) Con.—P. 726, pl. 18, fig. 9.
L.? OREGONENSIS, Con.—Pl. 18, fig. 11.

NUCULIDÆ.

NUCULA, Lam.

SUBGENUS ACILA, Adams.

N. CONRADI, Meek, (*N. divaricata*, Con.)—P. 723, pl. 18, fig. 6.

LEDIDÆ.

NEILO, Adams.

N. ABRUPTA (*Nucula,*) Con.—Amer. Jour. Science, 1848, p. 423, fig. 3.
N. OREGONA, (*Leda,*) Shumard.—Trans. St. Louis Acad., i., p. 121.
N. PENITA (*Nucula,*) Con.—Amer. Jour. Science, 1848, p. 433, fig. 10.
N. WILLAMETTENSIS (*Leda,*) Shumard.— Trans. St. Louis Acad., i., p. 121.

YOLDIA, Morch.

Y. IMPRESSA (*Nucula,*) Con.—P. 723, pl. 18, fig. 7.

PECTENIDÆ.

PECTEN, Lin.

P. PROPATULUS, Con.—P. 723, pl. 19, fig. 13.
P. COOSENSIS, Shumard.—Trans. St. Louis Acad., vol. i., p. 122.

BRACHIOPODA.

RHYNCONELLA, Fischer.

R. (*Terebratula*) NITENS, Con.—P. 723, pl. 19, fig. 1.

DESCRIPTIONS OF NEW SPECIES OF NORTH AMERICAN UNIONIDÆ.

BY JOHN G. ANTHONY.

UNIO STRIATISSIMUS, Anthony.—t. 12, f. 1.

Description.—Shell roughly striate, rhombic, depressed, rather thick; epidermis olivaceous, with green rays, more distinct at, and for a short distance below each mark of growth, which lines become obsolete, or nearly so, about midway between two of the lines of increase; old specimens have these rays so indistinct as to be scarcely perceptible, and the whole shell presents a uniform, greyish-olive color; beaks scarcely elevated, wrinkled at tip; marks of growth distant and very distinct; cardinal teeth large, broad, striate, deeply cleft in the left valve; lateral teeth long, curved, and with a long, smooth plate between them and the cardinal teeth; anterior cicatrices distinct and deep; posterior cicatrices well impressed, but confluent; nacre white.

Habitat.—Tennessee.

My Cabinet. Cabinet of George W. Tryon, Jr.

Observations.—This species is remarkable for its unusually rough exterior, being more rudely striate than any known American species. This character, combined with its dull greyish-olive color, its flattened form and rhombic outline, will readily distinguish it from all others. Some forty or fifty specimens have been observed, of all ages, and it is probably not uncommon where found. It is somewhat remarkable that so striking a species, occurring in a region often explored, should have so long been overlooked, which may, however, be owing to its being very local in habitat. May be compared with *U. scamnatus*, Mor., which it resembles somewhat in striation, but its form is less elongate, it is proportionally broader, more depressed, and its striæ are not so erect and prominent as in that species. From *U. stramineus*, Con., it differs in being less inflated, less elliptical, and its marks of growth are more crowded and rougher than in *stramineus*, while the color is very different.

UNIO DISTANS, Anthony.—t. 13, f. 2.

Description. — Shell smooth, elliptical, slightly inflated, rather thick; beaks somewhat prominent, finely and closely undulated at tip; epidermis yellowish-olive, relieved by beautiful dark-green rays over the umbones and anterior portion of the shell, while the posterior end, which is somewhat truncate and subangulated, is also darker in color, often of a blackish-brown; cardinal teeth double in both valves; posterior lobe of the right valve triangular, compressed, pyramidal and striated; anterior lobe small, pointed; the anterior lobe of the teeth in the left valve is narrow, conical, pointed, and the posterior lobe less elevated; the cleft between them is very deep and rather broad; nacre white and iridescent.

Dimensions.—Diameter ¾ inch; length 3 inches; breadth 1¾ inch.

Habitat.—Ohio.

My Cabinet.

Observations.—In form and general appearance not unlike *U. siliquoideus,* Barnes, but varies in several particulars, being more elongate, less inflated, and having its marks of growth stronger and darker in color; the green rays are also of a different shade and more interrupted. The epidermis is only moderately shining, never possessing the brilliant, shining surface of *siliquoideus.*

UNIO DEVIATUS, Anthony.—t. 12, f. 2.

Description.—Shell smooth, elliptical, moderately thick; epidermis olivaceous, with delicate, fine, capillary rays over the umbones and posterior part of the shell, obsolete on the anterior portion; beaks not elevated, very much eroded in all the specimens observed, but apparently never undulated; ligament very short and thin; cardinal teeth in the right valve long, curved and striate, or crenulate; in the left valve they are double, erect, slightly curved, and both deeply and widely cleft; anterior cicatrices distinct and well impressed; posterior cicatrices confluent; nacre white and iridescent on the posterior margin.

Habitat.—Tennessee.

My Cabinet. Cabinet of Hugh Cuming, London.
Mus. Comp. Zoology, Cambridge, Mass.

Observations.—Belongs to a group of which *U. capsæformis,* Lea, *U. Haysianus,* Lea, and *U. interruptus,* Raf., are prominent members. It differs from *capsæformis,* in being more inflated and narrower, while its peculiar sac-development is nearer the posterior basal edge in the female shell, and the males of each are still more unlike in appearance.

From *Haysianus* it differs by its longer form and thiner texture; and *interruptus*, Raf., which is the female of *brevidens,* Lea, is always broader, heavier and differently marked as to coloration.

UNIO SACCULUS, Anthony.—t. 12, f. 3.

Description.—Shell smooth, elliptical, inflated; valves rather thin; beaks somewhat prominent; epidermis olive-colored, and nearly covered with fine green rays, which become obsolete on the lower portion of the anterior half of the shell; cardinal teeth small, compressed, erect, double in both valves; lateral teeth short, curved and striated; nacre pearly white and iridescent.

Habitat.—Tennessee.

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass.

Observations.—Belongs to a group, the females of which are characterized by a bulbous swelling, containing the egg-sac. To this group belongs also, *U. capsæformis,* Lea, *deviatus*, Anth., *florentinus,* Lea, and many others. The present species has this enlargement more globular than those mentioned above, resembling in this respect the honey bag of a monster bee. Some twenty or thirty specimens have at various times been observed, all very uniform in appearance, and no one who has ever seen it can well mistake it for any other species.

ALASMODON IMPRESSA, Anthony.—t. 12, f. 4.

Description.—Shell smooth, elliptical, inequilateral, rounded before and biangular behind; substance of the shell rather thin; beaks subprominent, recurved, and undulate at tip; epidermis greenish-yellow, relieved by darker, fine, green lines, radiating from beak to basal margin, which is often emarginate; anterior portion of the shell regularly rounded, posterior portion biangular and darker in color, often quite brown; marks of growth distant, and very conspicuous, only two or three on each valve; anterior cicatrices lightly impressed, confluent; posterior cicatrices distinct and deeply impressed; nacre silvery white and iridescent.

Habitat.—Tennessee.

My Cabinet. Mus. Comp. Zoology, Cambridge, Mass.

Observations.—A small, but beautiful species, not readily confounded with any other; resembles *Alas. calceola*, Lea, in general form, but is less inflated, proportionally longer, and is generally emarginate on the basal edge, besides being less truncate on the posterior end. On the umbonial slope may generally be observed several short, distinctly-impressed lines often decussating; hence its name. Such lines are sometimes seen in other species, but not often, and never so conspicuously as in this.

ALASMODON RHOMBICA, Anthony.—t. 12, f. 5.

Description.—Shell smooth, quadrate or rhombic in form, somewhat inflated, obtusely angulated behind, rounded before, and nearly equilateral; substance of the shell somewhat thin; beaks prominent, rugosely undulate at the tips and for some distance below, occupying sometimes nearly half the first growth; epidermis olivaceous, faintly rayed, and with prominent, somewhat crowded marks of growth; these marks of growth are indicated by broad, darker bands, about four in number on each valve; anterior cicatrices rather deep and distinct; posterior cicatrices less deep and confluent; nacre deeply salmon-colored under the beaks, becoming fainter towards the basal margin, where it is bluish-white and shining, but not iridescent.

Dimensions.—Diameter $\frac{5}{8}$ inch; length 2 inches; breadth $1\frac{1}{4}$ inches.

Habitat.—Michigan.

My Cabinet. Cabinet of Hugh Cuming, London. Cabinet of George W. Tryon, Jr.

Observations.—This species cannot easily be mistaken for any other, its short, quadrate form being sufficient to identify it. In old specimens the epidermis is generally coarsely striate and nearly black. It is less elongate, and not elliptical, like *A. edentula*, Say, which often has the same colored nacre. The ligament of this species is yellowish-brown, rather short and slender. Among some twenty specimens now before me, I find very little variation; not nearly so much as is usual in this genus; and it is altogether a remarkably neat, pretty species.

ANODON SUBANGULATA, Anthony.—t. 13, f. 1.

Description.—Shell broadly elliptical, very inequilateral, rounded before and biangular behind; substance of the shell rather thick; epidermis greenish-yellow, the green predominating on the posterior half of the shell; beaks slightly prominent, undulate and rugose at tip; anterior cicatrices distinct and well impressed; posterior cicatrices indistinct and confluent; marks of growth widely separate and very distinct, about three on each valve; nacre bluish-white and iridescent.

Habitat.—Michigan.

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass. Cabinet of George W. Tryon, Jr.

Observations.—A fine, large species, and more robust than is usual in this genus. May be compared with *Anodon plana*, Lea, but is less inflated and of lighter color. It is also decidedly biangulated, which cannot be said of *A. plana*, and it is also more depressed than Mr. Lea's species. May, perhaps, better be compared with *Anod. Danielsii*, Lea, but seems to be larger, less inflated, and lighter colored, as well as more robust.

ANODON IMBRICATA, Anthony.—t. 14, f. 1.

Description.—Shell elliptical, somewhat inflated, inequilateral; substance of the shell rather thin; epidermis brownish-olive, darker on the posterior slope; beaks elevated, recurved, wrinkled; marks of growth crowded, darker in color than the general hue; ligament short, thin, brown; nacre silvery white and iridescent.

Habitat.—Camp Lake, Michigan.

My Cabinet. Cabinet of H. Cuming, London. Mus. Comp. Zoology, Cambridge, Mass.

Observations.—This species need not be confounded with any other; its graceful form and peculiarly rough, imbricated surface will readily determine it. The marks of growth are decidedly elevated, and are particularly close to each other near the basal edge. The roughness caused by these closely-set, projecting, concentric lines, will at once show the propriety of the specific name. The beaks are beautifully recurved, showing a long, narrow lunule.

ANODON OPALINA, Anthony.—t. 14, f. 2.

Description.—Shell smooth, inflated, elliptical, inequilateral, rather thin; epidermis yellowish, with rather distant marks of growth, about three on each valve; beaks prominent, with beautiful, fine undulations at tip; ligament long, slender, brownish yellow; anterior slope rounded, posterior slope subtruncate and biangular, with one or two impressed lines near the ligament; nacre silvery white and iridescent.

Dimensions.—Diameter 1¼ inch; length 3 inches; breadth 1¾ inches.

Habitat.—Shears Lake, Michigan.

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass. Cabinet of George W. Tryon, Jr.

Observations.—Its fine, translucent, yellow epidermis, together with its inflated form, will readily determine this species. It is extremely delicate in texture for so large a shell, and one evidently adult. Only three or four specimens have come under notice, but they all have the peculiar characters, and it is manifestly not the young of any other species. *Anod. pallida,* nob., herein described, is, perhaps, equally delicate; but the yellow color of that species is relieved by the green tinge near its base, and it is much more depressed. Other species may resemble this in some of its characters, but it seems to be peculiar in its soft, creamy white, diaphanous epidermis, and delicately rounded outline.

ANODON FLAVA, Anthony.—t. 14, f. 3.

Description.—Shell, smooth, thin, elliptical, very inequilateral; epidermis light brownish-yellow, very obscurely rayed; beaks slightly raised, and undulated at the tips; hinge-margin very straight; ligament rather short and thin; marks of growth distinct and distant, about three on each valve; anterior and posterior cicatrices scarcely perceptible; nacre silvery white and iridescent.

Habitat.—Michigan.

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass.

Observations.— Distinguished by its fine, soft, yellowish color, which is very opaque, looking as if painted on the shell: surface very plainly and closely concentrically striate; resembles *Anod. pallida,* nob, in form, but is less slender, thicker. and has the marks of growth more crowded and darker colored, besides being a rougher and more ventricose species.

ANODON SUB-INFLATA, Anthony.—t. 15, f. 1.

Description.—Shell long-ovate, much inflated, somewhat gibbous, very inequilateral; substance of the shell rather thick; beaks prominent, undulate at tip; epidermis olivaceous over the umbones and on the anterior portion of the shell, while its posterior end is darker, and even of a brownish tinge; marks of growth very distant and distinct, about three on each valve; dorsal line very straight; nacre silvery white and iridescent.

Dimensions.—Diameter 1½ inches; length 3⅝ inches; breadth 1⅞ inches.

Habitat.—Michigan.

My Cabinet. Mus. Comp. Zoology, Cambridge, Mass. Cabinet of George W. Tryon, Jr.

Observations.—Resembles *Anod. Dariensis*, Lea, in form, but is rather larger in proportion to its width, lighter in color, and the lines of growth are more distant and more distinct, while the whole epidermal surface is less uniform in color. The marks of growth are unusually distant, dark in color, rather broad, and seldom more than two on each valve, even of a large specimen. The posterior end is only slightly angulated, the angle nearest the ligament being the most distinct, and the surface there is usually lighter in color than on the umbones or the anterior part of the shell. Altogether, it is a graceful and beautiful species.

ANODON PAPYRACEA, Anthony.—t. 15, f. 2.

Description.—Shell smooth, elliptical, inequilateral, very thin; epidermis brownish-olive, with obscure, dark rays; beaks prominent, recurved, minutely rugose at tip; rounded before and angular behind; marks of growth very distant, and not very prominent; anterior and posterior cicatrices both confluent; nacre dirty yellow under the beaks, but this color does not extend beyond the middle of the valve, the lower portion being of a dull bluish-white color.

Habitat.?

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass.

Observations.—This is not a very showy species, but, nevertheless, rather an interesting one. Its dull, dark olive color and short, quadrate form may be sufficient to distinguish it from its congeners. In its general form, it approaches a Brazilian species, *Anod. obtusa*, Spix, but is thinner, more truncate, and less inflated. Old specimens are rather coarsely striate, and much darker in color. The species is always very thin, and uniformly so, being never thickened anteriorly, as most *Anodons* are. The beaks of this species are unusually prominent and recurved, with a very decided lunule.

ANODON PALLIDA, Anthony.—t. 15, f. 3.

Description.—Shell smooth, elliptical, thin, rounded before, biangular behind, and very inequilateral; epidermis pale yellow, with faint and fine green rays over the whole disc, which, being more numerous and crowded on the posterior part of the shell, gives it a decided green tinge near its lower margin; substance of the shell exceedingly thin, and very transparent; beaks slightly prominent, finely and closely undulate at the tips, having about ten waved wrinkles on the first growth; ligament rather short, pale in color, and very slender; posterior and anterior cicatrices very slightly impressed, being scarcely visible; nacre silvery white and very iridescent.

Dimensions.—Diameter ⅞ inch; length 3 inches; breadth 1½ inches.

Habitat.—Michigan.

My Cabinet. Cabinet of Hugh Cuming, London. Cabinet of Mus. Comp. Zoology, Cambridge, Mass. Cabinet of George W. Tryon, Jr.

Observations.—Cannot well be compared with any known species. Its pale, delicate coloring and beautifully undulated beaks will serve to identify the species; and its well defined and very distant lines of growth are also unusual in this genus. Rarely do we find more than two on each valve, and being quite dark, they contrast finely with the general color of the shell. In the regularity and beauty of the undulations on its beak, I have seen no species comparable with it, except, perhaps, *Anod. opalina*, herein described, and that species resembles this, also, in general tone of coloring, but is shorter, more inflated, and has not any of the green tinge so characteristic of *Anodon pallida.*

ANODON MICANS, Anthony.—t. 16, f. 1.

Description.—Shell smooth, elliptical, and very inequilateral; substance of the shell thin; epidermis brownish-olive, wrinkled or striate; beaks flattened, not prominent, and with apparently few, if any undulations at tip; shell not much inflated, rounded before and more depressed, and broadly, but not very distinctly biangular behind; anterior cicatrices distinct and well impressed; posterior cicatrices confluent; nacre of a brownish golden color over the whole interior, and very iridescent.

Dimensions.—Diameter 1 inch; length 2¾ inches; breadth 1⅝ inch.

Habitat.—Texas.

My Cabinet.

Observations.—Cannot well be compared with any of our species. Its exterior cannot be called attractive; its rich, golden-brown interior is its chief characteristic. Resembles *Anod. leprosa,* Villa, of Europe, in form, but is never so roughly decorticate, is a little more inflated, and the nacre of our species is incomparably richer and more brilliant. The posterior slope has two obscurely raised angles of a wavy character, and also marked by a dark-brown line on the summit of each. Its crowded marks of growth are distinguished by similarly colored lines, which are, however, narrower.

ANODON GLANDULOSA, Anthony.—t. 16, f. 3.

Description.—Shell elliptical, inequilateral, thin; epidermis yellowish-olive, with faint green rays over the whole disk; more numerous, and crowded on the posterior slope, which is consequently decidedly green; beaks but slightly raised, rugose at tip; marks of growth free, distant, and well defined; ligament long, thin, brown; nacre silvery white, and remarkably iridescent.

Habitat.—Michigan.

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass. Cabinet of George W. Tryon, Jr.

Observations.—This species may at once be recognized by its peculiar form,—like an elongated gland. When young it is beautifully and broadly rayed on the posterior half of the shell, whilst the anterior portion is so finely and delicately rayed, that it presents hardly more than an uniformly greenish-yellow surface.

Resembles in some degree *Anodon imbecillis,* Say, but is less inflated, less uniformly green, and the color is never so intense as in that species. The beaks of *Anodon glandulosa* are elevated and wrinkled, while those of *Anodon imbecillis* are flat and smooth. The marks of growth in this species are very conspicuous, and, with the broad green rays, give the shell a remarkably pleasing look. The posterior end is somewhat bi-angular, with a third raised line nearer the ligament, indicated by a darker color.

ANODON IRISANS, Anthony.—t. 16, f. 2.

Description—Shell smooth, elliptical, rounded before, and obscurely angulated behind; valves very thin and semi-transparent; epidermis olivaceous, with capillary green rays from the beaks to the basal margin, intersected by very conspicuous darker lines of growth, about seven or eight of these lines of growth being on each valve; posterior slope long, subangulated, somewhat excavated, and distinctly rayed; beaks rather prominent, with a few rugose undulations at the tips; ligament rather long, slender, pale brown in color; posterior and anterior cicatrices confluent and lightly impressed; nacre silvery white, and delicately iridescent.

Dimensions.—Diameter 1 inch; length 3 inches; breadth 1½ inch.

Habitat.—Michigan, in Bostwick's Lake.

My Cabinet. Cabinet of Hugh Cuming, London. Mus. Comp. Zoology, Cambridge, Mass. Cabinet of George W. Tryon, Jr.

Observations.—A decidedly beautiful species of this interesting genus: in form not unlike *Anod. pallida,* nob., but more ventricose, more solid, darker in color, and the marks of growth are closer and more decided, being quite prominent in old specimens, rendering the shell rough. Like *Anod. pallida,* it has the green color predominant at the base of the obtuse carina on its posterior end, and two rather marked, broad brown lines between that and the ligament. The nacre is very silvery and somewhat peculiar, in having numerous fine papillæ-like pin points scattered over it, which, however, may be only local peculiarity. Altogether, it is one of our most beautiful Anodons.

CATALOGUE OF THE SPECIES OF PHYSA, INHABITING THE UNITED STATES.*

BY GEORGE W. TRYON, JR.

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1. Physa ampullacea, Gould.

Ph. bullata, Gould.—Proc. Bost. Soc. Nat. Hist., v., p. 128. 1855.
Otia Conchologica, p. 215. 1862.

Habitat.—Oregon (Gld.)

2. Ph. Lordi, Baird.

Ph. Lordi, Baird.—Proceedings Zoological Soc., London Part I., p. 68. 1863.

Habitat.—Lake Osoyoos, Brit. Columbia, (Baird,) Washington Territory, (Coll. Tryon.)

3. Ph. Sayi, Tappan.

Ph. Sayi, Tappan.—Amer. Jour. of Sci., 1st ser., vol. 35, p. 269, t. 3, f. 3. 1838.
Kirtland, Report on Zoology of Ohio, p. 174. 1838.

Ph. ancillaria, Say, (Part.) Haldeman.—Monog. Limniades No. 6, p. 27, f. 9. 1843.

Habitat.—Lake Pepin, Ohio, (Tappan.)

4. Ph. plicata, De Kay.

Ph. plicata, De Kay.—Report on Mollusca of New York, p. 78, t. 5, f. 85. 1843.

Habitat.—New York, (De Kay.)

5. Ph. propinqua, Tryon, MS.*

Habitat.—Jordan Creek, S. W. Idaho, (Coll. Tryon.)

6. Ph. Warreniana, Lea.

Ph. Warreniana, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Habitat.—Loup Fork of Platte River, Milwaukee, Wis., Grand Rapids, Mich., (Lea.)

7. Ph. Traskii, Lea.

Ph. Traskii, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Habitat.—Rio Los Angelos, California, (Lea.)

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* Several species herein quoted as MS. are described for a future No. of this Journal, and will be published with lithographic figures.

8. PH. HALEI, Lea.

Ph. Halei, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.

Habitat.—Alexandria, La., (Lea,) San Felippe Springs, (Coll. Tryon.)

9. PH. GABBII, Tryon.

Ph. Gabbii, Tryon.—Proc. Acad. Nat. Sci., p. 149, t. 1, f. 14. 1863.

Contrib. to Conchology, vol. iii. 1865.

Habitat.—Mountain Lake, San Francisco, and Santa Anna River, Los Angelos Co., Cal., (Tryon.)

10. PH. VINOSA, Gould.

Ph. vinosa, Gould.—Proc. Bost. Soc. Nat. Hist., vol. ii., p. 263. 1847.

Lake Superior, p. 244, t. 7, f. 10, 11. 1850.

Otia Conchologia. 1862.

Habitat.—Lake Superior, (Gould.)

11. PH. FRAGILIS, Mighels.

Ph. fragilis, Mighels.—Proc. Bost. Soc. Nat. Hist., vol. i., p. 49. 1841.

Jour. Bost. Soc. Nat. Hist., vol. iv., p. 44, t. 4, f. 12. 1842.

Shells of Maine. 1843.

Haldeman, Monog. of Limniades, No. 6, p. 31, t. 3, f. 11—13. 1843.

Morse, Pulmonifera of Maine.

Habitat.—Maine, (Mighels.)

12. PH. LATA, Tryon, MS.

Habitat.—Juniata River, Hollidaysburg, Penna., (Tryon.)

13. PH. HUMEROSA, Gould.

Ph. humerosa, Gould.—Appendix to Blake's Geological Report, p. 23. 1855.

Explorations and Surveys, vol. v., p. 331, t. 11. f. 1—5, 1857.

Proc. Bost. Soc. Nat. Hist., vol. v., p. 128. 1858.

Habitat.—Colorado Desert, Pecos River, (Gould.)

14. PH. ANCILLARIA, Say.

Ph. ancillaria, Say.—Jour. Acad. Nat. Sci., vol. v., 1st series, p. 124. 1825.
Gould, Invert. Mass., p. 213, f. 142. 1841.
Adams, Shells of Vermont, p. 4. 1842.
DeKay, Moll. New York, p. 78, t. 5, f. 90. 1843.
Haldeman, Monog. of Limniades, No. 6, p. 27, t. 3, f. 1—10. 1843.
Binney, Works of Say, p. 114. 1858.

Ph. obesa, DeKay.—Mollusca of New York, p. 78, t. 5, f. 86. 1843.

Habitat.—Eastern and Middle States.

15. PH. HETEROSTROPHA, Say. *

Physa heterostropha, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 172. 1821.
Binney's Edit.,p. 46, t. 69, f. 6. 1858.
Appendix to Narrative of Long's Expedition, vol. ii., p. 264. 1824.
Gould, Invert. Mass., p. 211, f. 141. 1841.
Adams, Shells of Vermont, p. 4. 1842.
Haldeman, Monog. of Limniades, No. 6, p. 23, t. 1. 1843.
DeKay, Moll. of New York, p. 76, t. 5, f. 82. 1843.

Limnæa heterostropha, Say.—Nicholson's Encycloped., t. 1, f. 6. 1816.

Ph. fontana, Hald.—Cover of No. 2, Monog. of Limniades. 1841.

Ph. osculans, (Part.) Hald.

Ph. striata, Menke.—Synopsis, Meth. Mollusc., p. 132. 1830.

Ph. subarata, Menke.—Synopsis, Meth. Mollusc., p.132. 1830.

Habitat.—United States.

16. PH. INFLATA, Lea.

Ph. inflata, Lea.—Proc. Amer. Philos. Soc., vol., ii., p. 32. 1841.
Trans. Amer. Philos. Soc., vol. ix., p. 7. 1844.

Habitat.—Virginia, (Lea.)

17. PH. PRIMEANA, Tryon, MS.

Habitat.—Long Island, (Coll. Tryon.)

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* *Bulla crassula*, Dillwyn, *B. fontinalis*, Chemn., *Cochlea neritoides*, Lister, &c., are quoted by Haldeman and others for this species. I have carefully examined the figures and studied the descriptions of these authors, and cannot identify them.

18. Ph. brevispira, Lea.

Ph. brevispira, Lea.—Proc. Acad. Nat. Sci., p. 116. 1864.
Habitat.—Ottawa River, Canada West, (Lea.)

19. Ph. Niagarensis, Lea.

Ph. Niagarensis, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.

Habitat.—Niagara River, New York, (Lea.)

20. Ph. distinguenda, Tryon, MS.

Habitat.—Marysville and Stockton, California, (Tryon.)

21. Ph. occidentalis, Tryon, MS.

Habitat.—San Francisco, Centreville, Fort Tejon, Clear Lake, San Geronimo Creek, Dry Creek, California; Umpqua River, Warner's Valley, Oregon, (Tryon.)

22. Ph. politissima, Tryon, MS.

Habitat.—Sacramento, California, (Tryon.)

23. Ph. Blandii, Lea.

Ph. Blandii, Lea.—Proc. Acad. Nat. Sci., p. 116. 1864.
Habitat.—California, (Lea,) Marysville, California, (Coll. Tryon.)

24. Ph. malleata, Tryon, MS.

Habitat.—Hellgate River and Goose Lake Valley, Oregon. (Tryon.)

25. Ph. Nuttallii, Lea.

Ph. Nuttallii, Lea.—Proc. Acad. Nat. Sci., p. 116. 1864.
Habitat.—Lewis' River, Oregon, (Lea.)

26. Ph. diaphana, Tryon, MS.

Habitat.—Oakland, California, (Tryon.)

27. Ph. Whitei, Lea.

Ph. Whitei, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.
Habitat.—Lafayette, Georgia; Verdigris River, Kansas, (Lea;) Cooper River, South Carolina, (Coll. Tryon.)

28. Ph. pomilia, Conrad.

Physa pomilia, Conrad.—Amer. Jour. Sci., 1st series, vol. xxv., p. 343. 1833.
Müller, Synopsis Test. Viv., p. 35. 1836.
DeKay, Mollusca of New York, p. 81. 1843.
Habitat.—Claiborne, Alabama, (Conrad.)

29. PH. SHOWALTERII, Lea.

Ph. Showalterii, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.
Habitat.—Uniontown, Alabama, (Lea.)

30. PH. FORSHEYI, Lea.

Ph. Forsheyi, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.
Habitat.—Rutersville, Texas, (Lea,) Indianola, Texas, (Coll. Tryon.)

31. PH. COOPERII, Tryon, MS.

Habitat.—Crane Lake Valley, N. E. California. (Tryon.)

32. PH. GROSVENORII, Lea.

Ph. Grosvenorii, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.
Habitat.—Santa Rita Valley, Kansas? (Lea.)

33. PH. PARVA, Lea.

Ph. parva, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.
Habitat.—Verdigris River and Rock Creek, Kansas, (Lea.)
Probably young shell of *Ph. Grosvenorii.*—(G. W. T. Jr.)

34. PH. AUREA, Lea.

Ph. aurea, Lea.—Trans. Amer. Philos. Soc., vol. vi., p. 18, t. 23, f. 106. 1839.
DeKay, Mollusca of New York, p. 80, t. 5, f. 89. 1843.
Ph. heterostropha, Say, (part.) Haldeman.—Monog. of Limniades, No. 6, p. 23. 1843.
Habitat.—Warm Springs, Virginia, (Lea.)

35. PH. CONCOLOR, Hald.

Ph. concolor, Haldeman.—Monog. of Limniades, No. 6, p. 30, t. 2, f. 10. 1843.
DeKay, Moll., New York, p. 81. 1843.
(Too young to identify satisfactorily.)
Habitat.—Oregon, (Hald.)

36. PH. TRITICEA, Lea.

Ph. triticea, Lea.—Proc. Acad. Nat. Sci., viii., p. 80. 1856.
Habitat.—Shasta County, Cal., (Lea;) W. side of Stein's Mountain, and E. side of Warner's Mountain, Oregon, (Coll. Tryon.)

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37. PH. VIRGATA, Gould.

Ph. virgata, Gould.—Proc. Bost. Soc. Nat. Hist., vol. v., p. 128. 1855.
Otia Conchologica. 1862.

Ph. striata, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Habitat.—Gila River and San Diego, (Gould,) Santa Ana River, Los Angelos County, Cal., Mohave River, (Coll. Tryon.)

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38. Ph. sparsestriata, Tryon, MS.

Habitat.—San Joaquin Valley, California, (Tryon.)

39. Ph. costata, Newcomb.

Ph. costata, Newcomb.—Proc. Cal. Acad. Nat. Sci.

Habitat.—California, (Newc.)

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40. Ph. virginea, Gould.

Physa virginea, Gould.—Proc. Boston Soc. Nat. Hist., ii., p. 215. 1847.
Mollusca, U. S. Exploring Exped. p. 220, f. 138. 1852.

Habitat.—Sacramento River, (Gould,) Puget's Sound, Oregon, (Coll. Tryon.)

41. Ph. venusta, Lea.

Ph. venusta, Lea.—Proc. Acad. Nat. Sciences. p. 116. 1864.

Habitat.—Near Fort Vancouver, Oregon, (Lea.)

Very closely allied to, if it does not = *Virginea.*

42. Ph. tenuissima, Lea.

Ph. tenuissima, Lea.—Proc. Acad. Nat. Sciences, p. 114. 1864.

Habitat.—Alexandria, La., (Lea.)

43. Ph. Smithsoniana, Lea.

Ph. Smithsoniana, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Habitat.—Loup Fork, of Platte River, (Lea.)

44. Ph. Troostiana, Lea.

Ph. Troostensis, Lea.—Proc. Amer. Philos. Soc., vol. 2, p. 32. 1841.

Ph. Troostiana, Trans. Amer. Philos. Soc., vol. ix., p. 7. 1844.

Habitat.—Tennessee.

45. Ph. gyrina, Say.

Ph. gyrina, Say.—Jour. of Acad. Nat. Sci. 1st series, vol. 2, p. 171. 1821.
Adams, Shells of Vermont, p. 4. 1842.
Haldeman, Monog. of Limniades, No. 6, p. 32, t. 3, f. 1—6. 1843.
DeKay, Mollusca of New York, p. 79, t. 5, f. 87. 1843.

Ph. elliptica, Lea.—Amer. Philos., Trans., vol. v. p. 115, t. 19, f. 83. 1837.

Ph. Hildrethiana, Lea.—Proc. Amer. Philos. Soc., vol. ii., p. 32. 1841.
Trans. Amer. Philos. Soc., vol. ix., p. 7. 1844.

Ph. cylindrica, Newcomb.—DeKay, Moll., N. York, p. 77, t. 5, f. 84. 1843.

Habitat.—United States.

46. PH. GLABRA, DeKay.

Ph. glabra, DeKay.—Mollusca of New York, p. 80, t. 5, f. 88. 1843.
Lewis, Proc. Bost., Soc. Nat. Hist., vol. v., p. 298. 1856.

Physa elongatina, Lewis.—Proc. Bost. Soc. Nat. Hist., vol. v., p. 122. 1855.
Proc. Nat. Sci., Hist., vol. v., p. 298. 1856.

Habitat.—New York, (DeKay.)

47. PH. CROCATA, Lea.

Ph. crocata, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.

Habitat.—Lafayette, Georgia, (Lea.)

48. PH. HAWNII, Lea.

Ph. Hawnii, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Ph. Saffordii, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Habitat.—Lebanon and Nashville, Tennessee; Verdigris River, Kansas, (Lea.)

(*Ph. Saffordii*, Lea, appears to me to be the young of *Hawnii*.

49. PH. FEBIGERII, Lea.

Ph. Febigerii, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.

Habitat.—Logan County, Ohio, (Lea.)

50. PH. NICKLINII, Lea.

Ph. Nicklinii, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.

Habitat.—Allegheny County, Ohio, (Lea.)

51. PH. ALTONENSIS, Lea.

Ph. Altonensis, Lea.—Proc. Acad. Nat. Sci., p. 114. 1864.

Habitat.—Alton, Illinois, (Lea.)

52. PH. ANATINA, Lea.

Ph. anatina, Lea.—Proc. Acad. Nat. Sci., p. 115. 1864.

Habitat.—Northern Tributary of Arkansas River, Kansas, (Lea.)

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53. PHYSELLA GLOBOSA, Hald.

Physa globosa, Haldeman.—Proc. Acad. Nat. Sci., vol. i., p. 78. 1841.
Cover of No. 4, Monog. of Limniades. 1842.
Jour. Acad. Nat. Sci., 1st series, vol. viii., p. 200. 1842.
No. 6, Monog. of Limniades, p. 38, t. 5, f. 10–12. 1843.
DeKay, Moll, New York, p. 81. 1843.

Habitat.—Nolachucky River, (Hald.)

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54. PHYSODON MICROSTOMA, Hald.

Ph. microstoma, Haldeman.—Monog. of Limniades, Supplement to Part I. 1840.
No. 6, Monog. of Limniades, p. 39, t. 4, f. 12–14. 1843.

Habitat.—Kentucky, Ohio, (Hald.)

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55. BULINUS HYPNORUM, Linn. (sp.)

Bulla hypnorum, Linn.—Syst. Nat., Edit. 12, p. 1182.
Physa elongata, Say.—Jour. Acad. Nat. Sci., 1st series, vol. ii., p. 171. 1821.
Gould, Invert., Mass., p. 214, f. 143. 1841.
Adams, Shells of Vermont, p. 4. 1842.
Haldeman, Monog. Limniades, No. 6, p. 36, t. 5, f. 4–9. 1843.
DeKay, Mollusca of New York, p. 81, t. 36, f. 346. 1843.
Lewis, Proc. Bost. Soc. Nat. Hist., vol. v., p. 298. 1856.

Habitat.—United States.

56. BUL. BERLANDIERIANUS, W. G. Binney.

Bul. Berlandierianus, W. G. B.—Amer. Jour. Conch., No. 1, p. 51, t. 7, f. 8. 1865.

Habitat.—Texas, (Binney.)

57. BUL. HORDACEUS, Lea.

Ph. hordacea, Lea.—Proc. Acad. Nat. Sci., p. 116. 1864.

Habitat.—Vancouver Island, Oregon, (Lea.)

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58. ISIDORA DISTORTA, Hald.

Ph. distorta, Haldeman.—Supplement to No. 1, Monog. of Limniades. 1840.
No. 6, Monog. of Limniades. p. 35, t. 5, f. 1–3. 1843.

Habitat.—Mo., Ohio, Kentucky, (Hald.)

59. I. INTEGRA, Hald.

Ph. integra, Haldeman.—Cover of No. 3, Monog. of Limniades. 1841.
No. 6, Monog. of Limniades, p. 33, t. 4, f. 7, 8. 1843.
DeKay, Moll., New York, p. 81. 1843.

Habitat.—Indiana, (Hald.)

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60. I? SCALARIS, Jay.

Physa scalaris, Jay.—Catalogue of Shells, 3d Edit., p. 112, t. 1, f. 8—9. 1839.

Haldeman, Monog. of Limniades, No. 6, p. 34, t. 4, f. 9. 1843.

Annals of N. Y. Lyceum of Nat. Hist., vol. iv., p. 170. 1846.

(= Young of a large species of *Planorbis*?)

Habitat.—Florida, (Jay.)

Spurious Species.

Ph. planorbula, DeKay. — Moll. New York. p. 76, t. 5, f. 83. 1843.

= *Planorbis bicarinatus*, Say. (Young.)

Bulla fluviatilis, Say.—Jour. Acad. Nat. Sci., ii., p. 178. 1821.

= *Planorbis bicarinatus*, Say. (Young.)

Editor's Table.

REVIEWS.

I. *AMERICAN.*

Proceedings of the Academy of Natural Sciences of Philadelphia. No. 5.—November and December, 1864.*

Description of six new species of Western Asiatic Unionidæ: BY ISAAC LEA.

Unio Homsensis.
" *Kullethensis.*
" *Orphaensis.*

Unio Mardinensis.
" *Emesaensis.*
Monocondylœa Mardinensis.

These species are all from the rivers Tigris and Orontes, in Syria and Assyria. It certainly reflects great credit on American naturalists, that they are enabled, under great disadvantages, to anticipate their European brethren so frequently in the discovery of new forms of animal life in the interior of Asia and Africa. Mr. Lea has been very successful in this respect, and often, as in the present instance, has described very interesting new shells from localities frequented by European scientific men, who do not appear to have noticed them, or who confounded them with previously described species.

Proceedings of the California Academy of Natural Sciences, San Francisco, January, 1865.

Description of new species of Land Shells: BY W. NEWCOMB, M. D.

Helix Blakeana, Japan.
" *declivis*, "
" *Cronkhitei*, Oregon.
" *Rowelli*, Arizona.

Succinea Japonica, Japan.
Helix Hillebrandi, Newc. (Remarks on.)
Achatinella Alexandri, Maui.

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* We cannot too strongly condemn the practice of antedating their Proceedings, which the Academy have for some time indulged in. The present No. was issued, as nearly as we can tell, February 14th, 1865, and ought to bear that date.

Dr. Newcomb, who has assumed the task of identifying the terrestrial Mollusca collected by the Geological Survey of California, has, within the last few years, described a number of new species of *Helix* inhabiting that State and Oregon. Many of these are very beautiful species, of different type and more brilliant color than those of the Atlantic and Middle States. The number of species of Californian *Helices* is already quite large.

Description of new species of Marine Shells from the Coast of California: BY WM. M. GABB.

Muricidea Barbarensis.
Surcula perversa.
" *Carpenteriana.*
Clathurella constricta.
" *crystallina.*
Daphnella clathrata.
Mangelia hexagona.
Turbonilla gracillima.
Cancellaria (*Narona*) *Cooperii.*
Calliostoma tricolor.
Ptychostylis, n. g., (*Trochidæ.*)
" *caffea.*
Emarginula bella.
Gadinia (s. g. *Rowellia*, Cooper.)
" (*R.*) *radiata*, Cooper.
Tylodina fungina.
Circe (*Lyoconcha*) *Newcombiana.*
Yoldia Cooperii.

II. *FOREIGN.*

British.

Conchologica Iconica: BY LOVELL REEVE.

Parts 238, 239, *Marginella, Sigaretus, Unio.*

Parts 240, 241, ditto.

Parts 242, 243, *Ancillaria, Unio.*

Marginella (Aug., 1864,) is still incomplete; thirteen plates have, so far, appeared, illustrating fifty-seven species, of which the following are new:—

M. vitrea.
M. quadrilineata.

Sigaretus (July—Sept., 1864,) is completed, with twenty-seven species, illustrated by five plates. The new ones are:—

S. incisus, Malacca.
" *coarctatus*, Singapore.
" *tumescens.*
" *oblongus.*
" *eximius*, Malacca.
S. pellucidus, Malacca.
" *pictus*, Adelaide, S. Australia.
" *argenteus*, Australia.
" *fibula.*

Ancillaria (Nov., 1864.) This monograph comprises fifty-one species, being seven more than were monographed by Sowerby in 1859, in his Thesaurus Conchyliorum. The new species are:—

A. pyramidalis, New Zealand.
" *contusa.*
" *marmorata.*
" *sarda.*
A. monilifera, Swan River.
" *bulloides.*
" *oryza.*
" *fasciata.*

Unio (Aug.—Nov., 1864,) comprises, as far as published, over eighty species, most of which are American. The figures are not executed with that fidelity which usually distinguishes the pencil of Mr. Sowerby. The wrong valve is selected for figuring, and the shells, consequently, appear badly on the plates. No attention has been paid to delineating the undulations of the beaks, (actually the *most* constant of specific characters,) a feature which seems to be generally overlooked by European naturalists; nor is a fair idea of the convexity of the valves conveyed by these drawings. In species like *multiplicatus,* the tuberculated surface is made by far too prominent, and the tubercles themselves are too large. The coloring is a perfect success.

We regard it as a great misfortune that Mr. Reeve has seen fit to adopt the very uncertain names of Rafinesque for many of the species. As the completion of the monograph will still require a considerable time, we hope he will ignore these names for the future.

Unio cælatus (pl. 2,) is figured from a poor specimen of the species. The same may be said of *U. trapezoides,* (pl. 5.)

U. apiculatus (pl. 3, fig. 11) is *not* covered by a series of vaulted scales, as depicted in the figure.

We do not recognize *U. Phillipsii,* Conrad, in the figure, (pl. 4, fig. 15,) given for that species.

U. Elliottii (pl. 5, fig. 20) is figured from a miserable specimen, and is not at all characteristic.

U. quadratus, Raf., (pl. 6, fig. 24,) is certainly *not U. asperrimus,* Lea, but *U. lachrymosus,* Lea. What *U. quadratus really is* we cannot tell.

The "hump" on *U. dromas* (pl. 8, fig. 29) is not depicted, and *U. cicatricosus* (same pl., fig. 31,) is from a very poor specimen.

U. nodulosus (pl. 9, fig. 32) is not *Mya nodulosa,* Wood, which is a *Prisodon,*[*] but more like to, if it does not = *U. Leai,* Gray.

U. graniferus (pl. 9, fig. 34) is from a poor, half-grown specimen.

U. lachrymosus (pl. 9, fig. 33) is *U. asperrimus.*

U. Perlensis (pl. 11, fig. 42,) Con.—We spell it *Pearlensis.*

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[*] *Vide* Isaac Lea in Proc. Acad. Nat. Sci., Philadelphia, Vol. 6, 1853, p. 368.

U. bullatus, (pl. 12, fig. 43.)—A very poor specimen of this beautiful species has been figured.

U. pernodosus (pl. 12, fig. 46) does *not* inhabit "North Carolina," that we are aware of. Why has Mr. Reeve so hurried his descriptions as to forget, in most cases, to assign better localities than "North America" as the habitat? The localities were easily obtainable from the works he quotes as authorities, and he seems, by the omission, to be ignorant of the fact that there are distinct geographical groups of species of *Unio* in the United States.

U. Rangianus (pl. 14, fig. 54) we consider a pretty good *U. sulcatus*. *U. interruptus*, (*brevidens*, Lea,) *Arcæformis*, and *Sowerbyanus*, all figured on this plate, are remarkably poor.

U. deviatus (pl. 15, fig. 61) and *U. sacculus* (pl. 15, fig. 67) are the same as those herein described. Mr. Reeve's descriptions are from specimens in Cuming's collection, sent by Mr. Anthony, with MS. name attached.

U. perdix, Con., (pl. 18, fig. 82.)—The figure would never be taken for that species.

We trust that future numbers of Mr. Reeve's beautiful work will exhibit some improvement upon the ones now before us. The descriptions are not very good, but would answer with good figures; but the latter, so far as published, have an *unreal* look, are stiff, exaggerated in detail, and very unsatisfactory. We consider this work, by no means, equal to the other European monographs of *Unio*.

Annals and Magazine of Natural History, No. 83. Nov., 1864.

Remarks on Stilifer, a genus of quasiparasitic Mollusks, with particulars of the European species S. Turtoni: BY J. GWYN JEFFREYS.

Much information is given concerning the animal of this curious little shell, including details of habits, &c., and a full conchological history. Twenty-four species of *Stilifer* are enumerated.

No. 84, December, 1864.

Diagnoses of new forms of Mollusca from the Vancouver District: BY P. P. CARPENTER.

Mæra salmonea.
Angulus variegatus.
Miodon, (n. g.)
M. prolongatus.
Adula stylina.
Axinæa subobsoleta.
Siphonaria Thersites.
Gibbula lacunata.
" *funiculata.*
Hipponyx cranioides.
Bivonia compacta.
Lacuna porrecta.
" *compacta.*
" *variegata.*

Mopalia Swannii.
Margarita Cidaris, A. Ad.
Gibbula parcipicta.
“ *succincta.*
Isapis fenestrata.
Alvania reticulata.
“ *filosa.*

Remarks on Dentalium pretiosum, Nuttall: BY W. BAIRD, M. D. *With Notes on their Use by the Natives of Vancouver's Island and British Columbia:* BY J. K. LORD.

No. 85. January, 1865.

New Land-Shells from Travancore, Western and Northern India: BY W. H. BENSON.

Helix Basilessa.
“ *anax.*
“ *Travancoria.*
“ *pedina.*
“ *chloroplax.*
Achatina leptospira.
“ *Fairbanki.*
“ *Vadalica.*
Bulimus Smithei.

Diagnoses of new forms of Mollusca from the Vancouver District: BY P. P. CARPENTER. (Continued.)

?Assiminea subrotundata.
?Paludinella castanea.
Mangelia crebricostata.
“ *interfossa.*
? “ *tabulata.*
?Daphnella effusa.
Odostomia satura.
“ *Gouldii.*
“ *muciformis.*
Odostomia avellana.
“ *tenuisculpta.*
Scalaria Indianorum.
“ *tincta.*
Opalia borealis, Gould.
Cerithiopsis munita.
“ *columna.*
Cancellaria modesta.
Velutina prolongata.

No. 87, March, 1865.

Description of Helix odontophora, a new species of the the Corilla type, from Upper Ouvah, in Ceylon: BY W. H. BENSON.

Description of a new genus of Land Shells from the Island of Labuan, Borneo: BY HENRY ADAMS.

Plectostoma De Crespignii, H. Adams.

“It appears to have affinities with the genus *Boysia*, Pf., and *Hypselostoma*, Bens., from which, however, it differs in having the last whorl constricted at its separation from the others, and in the extraordinary prolongation backwards of the free portion. From *Boysia* it also differs in being more heliciform, and in having the umbilicus open; and from *Hypselostoma* in the aperture being edentulate.”

Diagnoses of new forms of Mollusca from the West Coast of North America, first collected by Col. E. Jewett: BY P. P. CARPENTER.

Solen rosaceus.
Amiantis (s. g. of *Callista.*)
Lazaria subquadrata.
Modiola fornicata.
Pecten æquisulcatus.
" *paucicostatus.*
" *squarrosus.*
Volvula cylindrica.
Phasianella punctulata.
" *pulloides.*
Phasianella elatior.
Trochiscus convexus.
Hipponyx tumens.
Bittium esuriens.
" *fastigiatum.*
Amphithalamus (n. g. *Rissoid.*)
A. inclusus.
Drillia mœsta.
Mitromorpha filosa.

Quarterly Journal of the Geological Society. Vol. 20, No. 80, Nov. 1, 1864, and Vol. 21, No. 81, Feb. 1, 1865.

Two excellent numbers, filled with interesting and valuable papers.

French.

Mollusques Noveaux, Litigieux ou peu Connus: BY J. R. BOURGUIGNAT. F. Savy, 24 Rue Hautefeuille, Paris.

1st *Fasiculus*, 22 pp. 8vo., 4 lithographic plates. March, 1863, contains:—

Descriptions of several new *Helices* of the same type as *H. tigriana*, Gervais, and, like that shell, inhabiting Algeria. Also:—

H. Aucapitainiana, Algiers, a near relative of *H. pygmæa* of Europe.

H. Nilotica, the Egyptian representative of *H. pomatia.*

H. Genezarethana, Mousson, from Syria.

Clausilia cedretorum and *C. Raymondi,* Bourg., both from Syria. The latter species is already represented in several American collections.

2d *Fasciculus*, 28 pp., 3 pl., April, 1863, contains:—

Description of a new Limax from the Pyrennees.

Observations on Helix pygmæa, and descriptions of new species belonging to the same group.

Mr. Bourguignat gives the following table:—

1. Shell smooth, or nearly so.	2. Shell always lamellated.
H. Debeauxiana, Bourg., Algiers.	*H. micropleuros*, Paget, France.
" *pygmæa*, Drap., France.	" *elachia*, Bourg., France.
" *Aucapitainiana*, Bourg., Algiers.	" *Poupillieri*, Bourg., Algiers.
" *Massoti*, Bourg., Perpignan.	

On Helix Berytensis, Fer.—Separating as new species the following, which have hitherto been confounded with it:

H. Rachiodia, Bourg. (*H. granulata*, Roth, pre-occupied.)
H. Fourousi, Bourg.

Descriptions of H. Colliniana, from the mountains of Sweden, resembling *H. strigella; H. Arrouxi*, Syria; and of a beautiful spinous ribbed *Pupa* from Spain,—*P. Raymondi.*

3*d Fasciculus*, 30 pp., 4 pl., December, 1863, contains:

Helix Lawleyanus, Bourg., Florence. A minute species.

H. lavendulæ, France. Somewhat like *H. Telonensis*, Mittre.

H. Mogadorensis, Mogadore.

H. tuberculosa, Con., Syria. (The type of Mr. Conrad's species is in the collection of the Academy of Natural Sciences, Philadelphia.)

H. philammia, Bourg.; *ptychodia*, Bourg.; *Ledereri*, Pf.; *Daviaiana*, Bourg. All of the same type as *tuberculosa*, and inhabiting Syria.

Pupa endolicha, Pyrennees.

Ampullaria Raymondi, Egypt, with synonymy, descriptions and figures of the other species of Egyptian *Ampullariæ.*

4*th Fasciculus*, 45 pp., 8 pl. March, 1864.

This number contains principally Syrian *Helices.*

H. Ehrenbergi, var. *chilembia*, *H. Kurdistana*, Parr., (new,) *H. guttata*, Oliv., and *H. Michoniana*, Bourg., separated from it.

Several varieties of *H. Cæsarea* and *H. spiriplana* are described.

M. Bourguignat remarks, that these descriptions indicate a special group of Asiatic *Helices*, closely related to certain Grecian species, such as *Codringtoni*, *eucincta*, *eupœcilia*, *euchromia* and *Parnassia*. The species of this group are, for the most part, excessively rare and little known. Two or three have been described and figured, but they have nearly always been confounded one with another. In order to end this confusion, he describes the new species, and to show their reciprocal affinities and differences, gives plates of all the species, eight in number. He forms two groups as follows:—

1. Species of which the superior whorls are convex, and not carinated.

H. Kurdistana.
" *Dschulfensis.*
" *Michoniana.*
" *guttata.*
" *Escheriana.*
" *Bellardii.*

2. Species with the superior whorls strongly carinated.

H. Cæsareana.
" *spiriplana.*

Then follows a detailed description of the specific differences.

Descriptions of new species of Ferussacia. With a full synonymy and synopsis of the genus, now numbering 51 species.

Malacologie de l'Algerie, ou Histoire Naturelle des Animaux Mollusques terrestres et fluviatiles, recueillis jusqu'a ce Jour dans nos Possessions du Nord de l'Afrique. J. R. BOURGUIGNAT.

This magnificent work is published in quarto, to be completed in Six Parts, of which four are before us. The lithographic plates are exceedingly well done, the paper and printing excellent.

Published by Challamel ainé, Paris. Price 20 francs each Part, or 120 francs for the entire work.

Part 1st, May, 1863, 80 pp., 8 pl., contains a very extended bibliography, followed by descriptions of the species of *Arion* 1, *Limax* 3, of which 1 is new; *Krinickillus* 1, with a synonymy of all the species; *Milax* 3, with a synonymy; *Parmacella* 1, with anatomical description; *Testacella* 3, *Succinea* 4, *Zonites* 10, of which 4 are new.

Part 2d, June, 1863, pp. 112 and pl. 9—18, contains *Zonites* 5 species, *Helix* 56, of which 14 are new.

Part 3d, Nov., 1863, pl. 19—32, contains 56 *Helices*, of which 13 are new, and a full index, completing the 1st volume.

Part 4th, Jan., 1864, pp. 144, pl. 7, contains *Bulimus* 9 species, of which 3 are new, *Azeca* 1, *Ferussacia* 24, of which 7 are new,* with a full synonymy of the genus, (also published in "Mollusques Noveaux, Litigieux ou peu Connus,") *Clausilia* 3, 1 of them new, *Pupa* 12, of which 5 are new, *Vertigo* 8, of which 2 are new, *Cæcilianella* 4, *Glandina* 2, *Carychium* 2, *Alexia* 4, of which 1 is new. Full synonymies of the species of the last two genera are given.

Bourguignat. Malacologie d'Aix-les-Bains. 1 vol., 8vo., 114 species, 3 plates. 1864. 10 francs.

Bourguignat, Malacologie de la Grande Chartreuse. 8vo., 1864., with a number of plates.

This prolific author announces the following forthcoming publications:

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* We do not remember ever before to have seen an author name a species after himself, as Mr. Bourguignat has done in *Ferussacia Bourguignatiana.*

1. **Etudes Anatomo-physiologiques sur les Mollusques.** 4to., in fasciculi, containing 4 colored plates. Each six francs.

Two parts are in press.

2. **Histoire Malacologique des Pyrennees.** 8vo., in fasciculi, with plates, at 5 francs each.

The first two Parts are in press, and contain :—

1. Malacological History of the Caverns of Bedeillac. Studies of *Helix lactea,* and particularly of the *H. lactea* of Perpignan.

   The true *Pupa Pyrenaica* and *Clausilioides.*
2. Complete Catalogue of the terrestrial and fluviatile Mollusks of the Oriental Pyrennees, preceded by a Critical Review of the works published on the Malacology of this Department.

3. **Histoire Malacologique de la Syrie et de la Mesopotamie.** To be published in 2 vols., 4 to., with 60 pl., at 120 francs.

Conchology of the Island of Bourbon: BY M. G. P. DESHAYES. 8vo., 144 pp., 14 col. pl. Paris. 1863.

560 species are enumerated, of which 129 are new. There are also 2 new genera described :

Prasina.—A curious new bivalve.

Scalenostoma.—A new shell, somewhat like a *Pyramidella,* or very like our *Gon. Conradi,* figured in our first No.

The new species, which are all figured, are of *Amphidesma, Anisodonta, Arca, Bulla, Conus, Cypricardia, Erycina, Lucina, Modiola, Nassa, Ostrea, Plicatula, Purpura, Rissoina, Siphonaria, Trochus, Cryptobia,* each 2.

Broderipia, Cardita, Cardium, Columbella, Cyclostoma, Cypræa, Dolabrifera, Dosinia, Galeomma, Gastrochæna, Haliotis, Janthina, Lima, Marsenia, Morrisia, Mytilus, Ovula, Pecten, Pedicularia, Pedipes, Perna, Phasianella, Pileopsis, Prasina, Psammobia, Rissoa, Saxicava, Scalaria, Scalenostoma, Scintilla, Solarium, Spondylus, Stylifer, Umbrella, Vanikoro, each 1.

*Cerithium, Teredo,** each 3.

Patella, Turbo, each 4.

Chiton, Leptoconchus, Pupa, each 5.

Emarginula, Helix, each 6.

Pleurotoma, 7.

Triphoris, 10.

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* Mr. J. Gwyn Jeffreys writes to me, that two of these are synonyms of species described by him in Annals and Magazine of Natural History, 1860. *T. affinis,* Desh., is a synonym of *T. excavata,* Lukis, and *T. brevis,* Desh., is a synonym of *T. cucullata,* Norman.

Archives des Sciences Physiques et Naturelles. No. 81. Geneva, Sept. 20, 1864.

On the succession of Gasteropodous Mollusca during the Cretaceous Period, in the Region of the Swiss Alps and of Jura: BY F. J. PICTET.

Revue et Magazin de Zoologie: Par Guerin Meneville. Monthly. 20 francs per annum. Paris, Rue des Beaux-Arts 4. 1864.

No. 3.

Mollusques Noveaux: BY AL. BONNET. With 2 colored plates.

Helix Brotii, Borneo.	*Bulimus amœnus*, Peru.
" *sinistra*, "	*Pupa varius*, Tasmania.
" *vitrea*, South America.	*Fissurella Tasmaniensis.*
Bulimus pictus, Peru.	

No. 5.

Persistance of Life in some Terrestrial Shells when exposed to marine waters. BY H. AUCAPITAINE.

The author selected one hundred specimens, of which twenty-seven survived several days' immersion.

Cyclostoma elegans, on account of its operculum, seemed to be most tenacious of life, as eleven out of twelve individuals survived. This experiment presents a good reason for the occurrence of the same species in countries or islands separated by salt water.

Nos. 6, 7, 8, 10, 11.

Mollusques litigieux ou peu connus. BY BOURGUIGNAT.

Already noticed by us as a separate work.

No. 9.

Coquilles Nouvelles. AL. BONNET.

Achatina Lorioli, Brazil.
Bul. Wairgeirensis.
Planorbis sinuosus,[*] New Mexico.
Littorina aurea. ?
Trochus mille-lineatus, Torres Straits.
Conus rubescens, Isle of Anam.[†]

Journal de Conchyliologie: BY H. CROSSE. 25 Rue Tronchet, Paris, 3d series, iv. No. 1, January, 1864, 88 pp., and 5 pl., of which four are colored.

Note on the rapidity of growth of Mytilus. BY P. FISCHER.

Additions to the Catalogue of Marine Shells of the Coast of Algiers. BY H. C. WEINKAUFF.

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[*] This appears to us to = *Pl. glabratus*, Say.

[†] The editor mentions, in a note, that this appears, on examining the collection of M. Deshayes, to be a var. of *C. canonicus.*

Observations on certain species of the Mediterranean. BY H. C. WEINKAUFF.

Notes on the Psammobiæ of Algiers, with a description of a new species. BY H. CROSSE.

Description of three new species. BY DR. BROT.

Melania plumbea, New Guinea.
Hemisinus Wesseli, Brazil?
Helix Humberti, *Ceylon*. (Of the group of *erronea*, Alb.)

Catalogue of the species of Pomatias, and description of a new one. BY H. CROSSE.

P. Hidalgoi, Spain.

Pomat septemspiralis, Razoumowski.—Hist. Nat., 1789. i., p. 278 is used instead of *maculatum*, Drap, 1805.

Description of five new species of Conus, BY A. BOIVIN.

Description of new species of the Caledonian Archipelago. BY M. SOUVERBIE and R. P. MONTROUZIER.

Columbella regulus, Souv.
Pedipes Forestieri, Mcn.

Diagnoses of new species. BY H. CROSSE.

Cyclophorus Debeauxi, Singapore.
Emarginula Thomasi, Red Sea.

Description of new species of several genera of Nudibranchiate Mollusks, from the vicinity of Port Jackson. BY GEO. FRENCH ANGAS.

7 sp. *Doris,* 1 *Actinodoris,* 1 *Angasiella,* (with description of the genus, by Crosse.) 8 *Goniodoris,* 1 *Polycera,* 1 *Plocamophorus,* 1 *Triopa,* 1 *Bornella,* 1 *Melibæa,* 1 *Janus,* 2 *Æolis,* 3 *Flabellina,** 1 *Elysia.*

Diagnosis of a new species of Odostomia. BY P. FISCHER.

Odos. Moulinsiana, France.

Description of the genus Pernostrea. BY MUNIER CHALMAS.

Six fossil species from the superior part of the Great Oolite. Five of these species are new, from France, and one from England, described originally by Lycett as *Ostrea Wiltonensis*, var. *monstrosa*.

Diagnoses of two new species of Belemnites. BY P. MAYER.
Bibliography.
Necrology. Moquin-Tandon. Bernardi.

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* We notice one species is named *Flabellina Newcombi*, after our friend Dr. Wesley Newcomb.

Journal de Conchyliologie. No. 2, April 1st, 1864.

Note on a Monstrosity of the Animal of Patella vulgata. BY P. FISCHER.

Monography of the genera Stylifer and Entoconcha. BY P. FISCHER.

One species of the former new.

Critical Study of the Auriculaform Bulimi of new Caledonia. BY H. CROSSE.

Twenty-three species are enumerated and described with full synonymy.

Description of a new species of Corbicula. BY T. PRIME.

C. Angasi, Australia.

Description of new species. BY H. CROSSE.

Emarginula Thomasi, Red Sea.
Planorbis Schrammi, Island of Guadeloupe.

Descriptions of new Shells. BY ARTHUR MORELET.

Helix Cottyi, Algiers. *Melanopsis Tingitana*, Algiers.
Anodonta Tunizana.
Helix Paivana, Gomerensis quadricincta, Canaries.
H. inermis, Bul. Æthiops, obsoletus, electrinus, Ampul. palustris, —Africa.
Unio megapterus, U. Mandarinus, Cochin China.

Journal de Conchyliogie. No. 3, July, 1864.

Monographie du genre Rissella. BY A. CROSSE.

Since the publication in the "Conchylien Cabinet," twelve years ago, of a Monograph by Dr. Philippi, of this small genus of trochiform shells, peculiar to the Australian seas, but little has been done to extend our knowledge of them. The present paper reviews their synonymy and gives very full specific descriptions. M. Crosse has added a new species, *R Bruni.*

Procédé pour la préparation des Limaciens: BY E. DUBRUEIL.

Addition a la note sur l'origine de l'Ambre gris: BY PROF. J. BIANCONI.

Observations sur le genre Fossar. (Fossarus): BY M. C. RECLUZ.

Note sur le genre Fossarus, suivie du catalogue des espèces: BY P. FISCHER.

Mr. Arthur Adams in 1853 proposed to form a family (*Fossaridæ*) for the reception of the genera *Fossarus* of Philippi, *Isapis,* H. & A. Adams, and several new genera, which he characterized under the names of *Conradia*, *Couthouyia*, *Cithna*, *Gottoina*. To these, M. Fischer proposes to add *Ariadna*, the type of which is *Trichotropis borealis.*

We are indebted to Mr. Arthur Adams for a very large increase in the number of described species of *Fossarus.* His monograph of the genus, published in the Proceedings of the Zoological Society, 1853, contained nine species, five of which were then first described. In 1863 he added about twenty additional species from the seas of China and Japan. Messrs. C. B. Adams and P. P. Carpenter have described most of the American species.

The list, as now given by M. Fischer, embraces forty-four recent and four fossil species, with their synonymy and geographical distribution. Of the living forms, more than half belong to the Japanese fauna, five to the Mediterranean and west coast of Africa, two to the West Indies, and nine to Mazatlan and Panama.

Descriptions d'espèces nouvelles de l'Archipel Calédonien: BY M. SOUVERBIE and R. P. MONTROUZIER.

Marinula Forestieri, Montr.
Turbo naninus, Souv.
Pleurotoma apiculata, Montr.
Pisania Billeheusti, Petit.
var. *P. Artensis.*
Fusus Desmoulinsi, Montr.
Columbella sublævis, Montr.
" *articulata*, Souv.
Nassa tringa, Souv.
" *acuticosta*, Montr.

Description d'espèces nouvelles de l'Australie méridionale: BY H. CROSSE.

Buccinum Angasi.
Trophon Paivæ.
Buccinum Adelaidense.

Description d'une espèce nouvelle: BY H. CAILLET.

Columbella Saint Pairiana. Marie Galante, Antilles.

Diagnoses de Mollusques terrestres noveaux: BY. H. CROSSE.

Helix Lienardiana, Salomon's Isle.
" *Hidalgoiana*, Oceanica.
" *Primeana*, China.
" *Bocageana*, China.
" *Cailleti*, Oceanica.
Helix Mabillei, Oceanica.

Description de Coquilles inédites: BY A. MORELET.

Bulimus ingenuus, Isle Mayotte.
" *spinula*, Gaboon River.
Melania psorica, Madagascar.
" *soriculata*, Grand Bassam.
Neritina cristata, Gaboon River.
Paludomus cyanostomus, Siam.
Unio Massini, Cochin China.

Helix seminigra, Australia.
Pupina Coxi, "
Melampus tetricus.

Journal de Conchyliologie, No 4. Oct., 1864.

Note sur la présence du genre Dreissena dans les eaux de la Loire: BY P. FISCHER.

Note sur le developpement des Mollusques dans le port de Toulon: BY H. AUCAPITAINE.

Description d'espèces nouvelles de Shanghai et du nord de la Chine: BY H. CROSSE and O. DEBEAUX.

Helix Arcasiana.	*Helix Tchefouensis.*
" *Yantaiensis.*	" *Frilleyi.*

Description d'une espèce nouvelle: BY H. CROSSE.

Cyclophorus Debeauxi, Isle of Singapore.

Faune Malacologique de Cochin chine. Premier Supplément: BY H. CROSSE and P. FISCHER.

The new species are:—

Donax Saigonensis.	*Helix Billeheusti.*

Diagnose d'une nouvelle espèce de Volute de l'Australie: BY G. B. SOWERBY.

Voluta Ellioti.

Description d'espèces nouvelles provenant de l'Australie méridionale: BY H. CROSSE.

Trochus Blandianus.	*Liotia Angasi.*
" *abnormis.*	*Phasianella Angasi.*
" *Ramburi.*	*Nassa Munieriana.*

Diagnoses Molluscorum Australiæ méridionalis: BY H. CROSSE and P. FISCHER.

Buccinum filiceum.	*Fissurella concatenata.*
Scalaria delicatula.	*Patella calamus.*
" *consors.*	*Mactra amygdala.*
Cerithium monachus.	" *(Mulinia) pinguis.*
Turritella spina.	*Periploma Angasi.*
Fissurella omicron.	*Mesodesma obtusa.*

Description de Coquilles fossiles des terrains tertiaires supérieurs: BY C. MAYER. (Continued.)

Corbula Tournoueri.	*Dentalium Burdigalinum.*
Mactra Burdigalensis.	" *Lamarcki.*
Syndosmya Rolandæ.	" *parvum.*
Tellina aquitanica.	*Scalaria Billaudeli.*
Cardium Palasanum.	*Sigaretus suturalis.*
" *fraternum.*	*Fasciolaria Jouanneti.*

Note sur genre Pernostrea: BY P. FISCHER.

Description de Coquilles fossiles des terrains jurassiques: BY C. MAYER.

Belemnites peregrinus.	*Ammonites Langi,*
" *Sæmanni.*	" *præcursor.*
" *dispar.*	" *opalinoides.*
Ammonites Dyonysii, Mœsch.	" *Rauracus.*
" *Escheri.*	" *Rœmeri.*

Russian.

Bulletin de l'Academie, Imp. des Sciences de St. Petersbourg. v., No. 7.

Vorläufige Diagnosen einiger neuer Gastropoden-Arten aus dem Nord Japanischen Meere: BY DR. L. V. SCHRENCK.

Chiton Albrechtii.	*Trochus globularis.*
" *Lindholmii.*	*Natica bicincta.*
" *Nordmannii*	*Tritonium Jessoense.*
" *subrufescens.*	" *pericochlion.*
Trochus Jessoensis.	*Voluta pusilla.*
" *iridescens.*	

SCIENTIFIC INTELLIGENCE.

As *Helix Binneyana,* a name given by Mr. E. S. Morse (Cat. Terrest. Pulmonifera of Maine, 1863,) to a new species described by him, is preoccupied by Dr. Pfeiffer, (Zeit. für Mal., 1847,) we propose that Mr. Morse's species be designated hereafter as *Helix Morsei.*

Our readers will be interested to learn that Mr. John G. Anthony has departed with Prof. Agassiz and other naturalists, for Brazil. The party are under the direction of Prof. A., and their object is, the collection of specimens of natural science for the Museum of Comparative Zoology, Cambridge. Mass. Mr. Anthony is well known as a veteran collector of shells, and will, doubtless, bring home with him very large collections. The interior of Brazil has really been very imperfectly explored for shells, and we may reasonably expect that many species, unknown to science, will reward the patience and skill which Mr. A. knows so well how to employ in his favorite pursuit.

We notice that Mr. Jelski, of the University of Kieff, is about to depart for Cayenne, intending to explore the zoology, and particularly the conchology, of that part of South America; and another gentleman, M. Bocourt, of Paris, is attached as zoologist to the Scientific Commission which the French Government is about to send to Mexico.

CORRECTION OF DATE OF PUBLICATION.—When the first sheet of No. 1 of this Journal was printed, the date Feb. 15th was affixed to the title, but various causes delayed the final publication until Feb. 25th. As exactitude in such matters is of the greatest importance in determining questions of priority, we suggest that subscribers alter the date on the title of No. 1 with ink, in order to avoid possible future trouble.

We feel, that to those who have worked long in science or literature, and who, therefore, can appreciate the difficulties with authors, compositors and proof-readers surrounding the the hurried preparation of a new periodical, an apology is scarcely necessary for the very numerous short-comings of our first number. We hope and believe that the present one at least exhibits *improvement.*

We do not give an *original* portrait in this number of our Journal, because the large excess of colored plates, beyond the promises made in our Prospectus, makes an aggregate cost far exceeding any hope of immediate remuneration. We are exceedingly obliged to our friend, Mr. T. A. Conrad, for very kindly drawing and *presenting* us with the first six plates of this number.

We may as well say here, that, if properly supported by our subscription list, it is our intention *to illustrate every species published in this Journal.*

Our old correspondent, Dr. G. von dem Busch, of Bremen, Germany, writes to us, that he would be very glad to have *live specimens* of American *Helices,* for the purpose of making some investigations and comparisons of their lingual dentition, and for other anatomical researches.

Conchologists, who will take the trouble to send, packed in moist moss, the species of their neighborhood, directed as above, per Bremen steamer from New York, will greatly oblige a gentleman, who can give them a rich exchange for their trouble, and at the same time will aid in the important work for which these specimens are required.

We have received a note from Isaac Lea, Esq., calling attention to the fact, that Mr. Conrad, in his "Synopsis of Eocene Mollusca," has given the wrong date of 1834 to "Lea's

Contributions to Geology." Mr. Lea proves to us, that his work was read before the Academy of Natural Sciences, August 27th, 1833, and was printed and distributed in the latter part of November, or beginning of December, 1833—the *exact* date cannot be ascertained.

Mr. Conrad was in Alabama at the time that this work, as well as his own "Fossil Shells of the Tertiary Formation," was published, and desires us to correct the unintentional error he has made regarding the date of publication of Mr. Lea's book.

We offer the following dates, copied from the Minute Book of the Academy of Natural Sciences of Philadelphia:

Aug. 27th, 1833, Mr. Lea read his paper on "Tertiary Formation of Alabama" before the Academy of Natural Sciences, describing 202 species.

Sept. 3d, 1833, Mr. Conrad's work, "Fossil Shells of the Tertiary Formation," presented to the Library. (Presumed to be to No. 3, inclusive.

Nov. 26th, 1833, Dr. Morton presented to the Library the 4th No. of Mr. Conrad's "Tertiary Fossils."

Dec. 10th, 1833, Lea's "Contributions to Geology," (including his paper on Tertiary Fossils of Alabama,) presented by the author.

Mr. Conrad probably has priority in printed publication. But Mr. Lea claims priority upon the "reading" of his paper to the Academy of Natural Sciences, Aug. 27th, 1833. While we, in common with most conchologists, recognize in the date of publication of printed paper the only correct rule for determining questions of priority, yet it is still, we believe, an unsettled point, whether this comparatively recent rule ought to be extended back in its application to a time when all the principal publishing Societies united in determining priority by date of reading. It is a question, how much the interests of science are benefited by innovation in such cases.

We do not know that any authoritative decision has been made on a like question since the general adoption of the Rules of the British Association, and are not prepared to give our own opinion at present. We, therefore, merely state the facts as above, and leave our readers to form their own conclusions.

Mr. Conrad, we should add, repudiates, and always has done so, the reading of papers, as establishing priority; while Mr. Lea has always adhered to the date of reading, which is in accordance with the rules of the French Academy, the Royal Society of London, the American Philosophical Society, &c.

CORRECTIONS AND ADDITIONS TO MR CONRAD'S CATALOGUE OF EOCENE MOLLUSCA, PUBLISHED IN 1ST NUMBER OF THIS JOURNAL.

Circumstances having prevented me from seeing a revise of the Eocene Catalogue of Shells, published in the first number of this Journal, typographical and more important errors have occurred which demand an early correction.

Pholadomya.—It was intended to refer this genus to *Anatinidæ*, instead of *Corbulidæ*. For *Pholdomya* read *Pholadomya*, p. 3.

For *Anatidæ* read *Anatinidæ*, p. 3.

Dione Astartiformæ read *Astartiformis*, p. 6.

Cardiidæ should be over *Cardium*, p. 7.

Venericardia, p. 7, should be under *Family Astartidæ*.

A. parva read *A. parvus*, p. 10, fourth line from top.

For *Stalagmum* read *Stalagmium*, p. 10.

Arcinæ read *Arcidæ*, p. 11.

Axinæa stamina read *A. staminea*, p. 12.

For *Trigonocœlix* read *Trigonocœlia*, p. 12.

Gryphæostrea read *Gryphæostrea*. The species *subeversa* is probably identical with *Ostrea eversa*, Deshayes.

Ostrea should be under *Ostreidæ*, and *Anomiidæ* with *Anomia*, *jugosa* and *Ruffini* transferred to p. 15, over *Anomia*.

For *Bolton* read *Bolten*, on p. 16, line sixth from the bottom.

Neptunea lintea, p. 17, is *Strepsidura lintea*.

Fusus deculsstus read *F. decussatus*, p, 17.

Buccitriton altus read *B. altum*, p. 20.

Distortio read *Distorsio*, p. 20.

Sanellina read *Ranellina*, p. 21.

Ragenella read *Sagenella*, p. 21.

S. bellalvirata read *S. bellalirata*, p. 21.

Cornuliria read *Cornulina*, p. 21.

Rouatt. read *Rouault.*, p. 23.

T. amœna read *T. amœnus*, p. 28.

Cœlatura striata and *sulcata*, p. 28, should be at the top of p. 35.

Niso umbilicata, (*Pasithea*,) Lea.—Cont. to Geol., &c., must be substituted for the sixth line, p. 29, and strike out *Bonellia lineata*, which is a *Miocene* species.

S. depressa and *bella*, p. 30, read *depressus*, *bellus*.

Humphreys read *Humphrey*, p. 33.

Fessurellidæ read *Fissurellidæ*, p. 35.

Sulcobuccinum, D'Orbiny.—Probably identical with *Pseudoliva*, Swains. The American species are peculiar in being umbilicated before maturity.

ADDITIONS.

TORNATELLÆA, Conrad.

T. BELLA, C.—Jour. Acad. Nat. Sci., vol. iv., p. 294.
T. LATA, (*Actæon,*) C.—Amer. Jour. Conch. 1865.
OSTREA MORTONII, Gabb.—Proc. Acad. Nat. Sci., p. 329. 1861.
NUCULANA EQUALIS (*Nucula,*) C.—Foss. Shells of Tert. Form., p. 46.
N. media, Lea.—Cont. to Geol., p. 83, t. 3, fig. 62.

Eburnespecten, Conrad, p. 140, this number, is a synonym of *Camptonectes,* Agas.

AMERICAN

JOURNAL OF CONCHOLOGY.

VOL. I. JULY 1, 1865. No. 3.

MEMOIR OF CHARLES B. ADAMS, LATE PROFESSOR OF ZOOLOGY IN AMHERST COLLEGE, MASSACHUSETTS.

BY THOMAS BLAND.

Charles B. Adams, the subject of this Memoir, was born in Dorchester, Massachusetts, on the 11th of January, 1814. Of a family of six children, he was the only one spared to his parents. When four years old, his father, Mr. Charles J. Adams, established himself in business in Boston, and resided there during the rest of his life.

At a very early age C. B. Adams manifested a decided taste for Chemistry and Natural History, in which he was encouraged by his parents, who gave up a room to him for a laboratory, and furnished the means for procuring apparatus and chemicals. Time usually spent by boys in sports and amusements, was occupied by young Adams in experimenting, and in the study and arrangement of the various specimens in Natural History contributed by his friends and collected by himself in walks with his father.

C. B. Adams was prepared for College in Boston, and at the Phillips Academy, Andover. In October, 1830, he entered Yale College, but removed to Amherst College, and there joined the Sophomore Class in September, 1831. In 1834 he graduated at Amherst with the highest honors. Shortly afterwards he entered the Theological Seminary at Andover, but in June, 1836, abandoned his Theological studies to assist Professor Hitchcock in a geological survey of the State of New York. The magnitude of the undertaking, and especially imperfect health, soon led Professor Hitchcock to abandon the work, and Adams, although strongly urged to do so, was unwilling to assume the lead in labors given up by one so much older and more experienced in science. Returning to Amherst, he spent several weeks in preparing a course of lectures on Geology, which he delivered in Bradford Academy, in September, 1836. In October of that year he became a Tutor in Amherst College, and in the following Spring delivered another course of lectures on Geology in Bradford Academy.

C. B. Adams was invited, in the Autumn of 1837, to accept the Professorship of Chemistry and Natural History in Marion College, at Marion, Missouri, and went there to learn the condition of the Institution before deciding to accept the proffered appointment. The College was in its infancy, with very few students, and its financial affairs were in an unsettled state. The prospect was discouraging, and after a few months of hard labor, Adams returned to his home in Boston. Subsequent events proved the prudence of his decision,—Marion College was given up, its founders being unable successfully to establish it.

In September, 1838, C. B. Adams accepted the appointment of Professor of Chemistry and Natural History in Middlebury College, Middlebury, Vermont. Indefatigable in his exertions, ever ready to aid and encourage the students, he became a very popular teacher, and was held in the highest estimation by the Trustees and the Faculty, who contributed every thing in their power to render his position happy and desirable.

In February, 1839, Professor Adams married Mary, daughter of the Rev. Sylvester Holmes, of New Bedford. He visited the Island of Jamaica, West Indies, in the Winter of 1843-44. The Professor's health, as well as that of his family, eventually suffered from the severity of the climate of Vermont, and a change becoming absolutely necessary, he, with much regret, resigned his Professorship in August, 1847. He removed from Middlebury to Amherst, and immediately commenced his labors in the College there as Professor of Zoology and Astronomy,—labors which terminated only with his death, in 1853.

While Professor in Middlebury College, C. B. Adams was appointed Geologist of the State of Vermont, entering upon its duties in 1845, and continuing in the office for three years. He presented the results of his labors to the State in four "Annual Reports," (1845–48;) but the funds appropriated became exhausted, and the final report was not made before the Professor's removal to Amherst. Subsequently he was too much absorbed in other scientific pursuits to attend to it, although solicited to finish the work.

Established at Amherst, (1847,) Professor Adams took a deep interest in the College, his *Alma Mater*, and soon substantially proved it by presenting to the Institution his extensive and valuable collections of Natural History, on certain conditions, however, of which the following deserve to be recorded:—

"A fund, not less in value than the above mentioned gift, viz: $5000 or more, shall be established, to be called 'The Natural History Fund.'

"The income of this fund, and of such additions as may be made to it, shall be used for ever for increasing the collection of books of Natural History and of specimens in Natural History belonging to Amherst College.

"This expenditure shall be made by myself during my official connection with the College, and subsequently by the officer or officers of instruction, who shall have charge of the department of Natural History, and shall be subject to such regulations as the Trustees of the College may deem requisite to secure its faithful appropriation to the objects specified.

"The words 'increase of books and of specimens,' are not intended to include the care and exhibition of the same; but these may be included, in case the general treasury of the College shall be embarrassed with debt. So much of the income as shall not be expended within the year in which it accrues, shall be added to the principal."

To the written conditions referred to is added the following "remark," characteristic of its distinguished author:—

"This gift, with these conditions, is made with a view to contribute in some small degree to the exhibition of the glorious plan of creation, especially of the creation of organic beings, as this plan exists in the mind of the Creator."

The gift in question was accepted by the authorities of Amherst College, and the conditions have, it is hoped, been faithfully performed. The collections, enriched by the unceasing efforts and successful explorations of Professor Adams, remain at Amherst, a monument of his extraordinary labors.

The Professor again visited Jamaica in the winter of 1848–49. In November, 1850, he went to Panama, returning, early in

1851, to the United States, by way of Jamaica, where he was the guest of the late Hon. Edward Chitty.

Between the years 1838 and 1850, a considerable number of Professor Adams' papers relating to Mollusca* were published in the Proceedings of several Scientific Societies and in various Journals. Most of those papers which embraced the results of his explorations in Jamaica were, from time to time, re-published, with much original matter, in the "Contributions to Conchology," (issued in twelve parts, between October, 1849, and November, 1852,) and in Monographs of the genera *Stoastoma* and *Vitrinella*. In the autumn of 1852 his "Catalogue of Shells Collected at Panama" appeared, and also "Elements of Geology," the latter the joint production of himself and the late Professor Alonzo Gray. The last paper by Professor Adams was the "Catalogue of species of *Lucina* which inhabit the West Indian Seas," written in November, 1852, and published in the concluding part of the "Contributions."

Anxious to pursue further investigations in the West Indies, with a view to the completion of a work on the Shells of the Zoological Province, embracing those islands, Professor Adams left for St. Thomas, by way of Bermuda, in December, 1852. He arrived at St. Thomas on the 27th of that month, and on the next day addressed to the writer of this memoir a letter, from which the following extract will be read with interest:—

"Had a storm first night out; got to the east end of Bermuda Saturday evening, and up to town Sunday morning; off Monday noon. At Bermuda got forty to fifty species of shells, mostly in quantities,—one or two new *Pedipes*, two or three new *Auriculæ*, a new *Siphonaria*, any quantity of *Truncatella*, and of the ten or dozen species of land shells, among which is a very small, dirty *Succinea*, but got only one of *Helix Bermudensis;* the large *Succinea* plenty. Got a new *Modulus*, a variety of *Columbella cribraria*, more like the Panama than the West India shell! I forgot about your reply to K.'s letter. That awful nervous headache quite spoiled me in New York. Luckily, I got over it the day before we reached Bermuda.

"I was perfectly enraptured with Bermuda for scenery and shells. I must have taken three or four thousand specimens, not yet assorted. It will be curious to learn the distribution of the land shells on the different islands. Mr. John H. Redfield, you and myself must make a special expedition to Bermuda, have a skiff, and visit them all."

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* For a complete list of these papers, consult "List of American Writers on Recent Conchology," by G. W. Tryon, Jr., N. Y., 1861, and "Bibliography of North American Conchology, (Smithsonian Miscellaneous Collections,)" by W. G. Binney, 1863–4.

Professor Adams, as had been previously arranged, was most kindly and hospitably entertained at St. Thomas by Mr. Robert Swift. The Professor's health had been so much impaired by his unceasing labors, (he never allowed himself more time for rest than nature absolutely demanded,) that he easily fell a prey to disease. He contracted fever, and, notwithstanding the most devoted attentions and the best medical care, died on the 18th of January, 1853, at the early age of thirty-nine years,—a martyr, it may with justice be said, to the cause of science. His remains were deposited in the burial ground at St. Thomas, where a tablet was erected by his friends as a memorial of his worth and their esteem.

The Professor's widow, an estimable lady, and five children, four sons and a daughter, survived him; two of the former enlisted in the service of their country in the army, and died in the autumn of 1861, the one at Brooklyn, N. Y., and the other at Annapolis, Md., of diseases contracted in the performance of their military duties.

The published works of Professor Adams and the collections at Amherst College give ample evidence of his great abilities, of his untiring energy, industry and perseverance, of his unselfish devotion to science. Earnest and able in the performance of his duties as Professor, successful and popular as a teacher, of upright and irreproachable character, his loss will long be deplored at Amherst. In his domestic relations he was gentle and affectionate, in his friendships faithful and generous.

The principal conchological works of Professor Adams—the "Contributions to Conchology," and "Catalogue of Shells Collected at Panama, with Notes on their Synonymy, Station and Geographical Distribution"—deserve more than the passing notice which they have received in the foregoing memoir, and we propose shortly to review their contents, so far, at least, as to show the character of the Professor's opinions and the extent of his labors. Our limits do not permit of further reference to his writings on Geology.

Professor Adams found an unexpectedly rich field for research, especially as regards Land Mollusca, in the Island of Jamaica, and to him belongs the merit of especially directing the attention of naturalists to the shell-faunas of the West Indies. At the date of his first visit to Jamaica comparatively few species from those islands were known; since he commenced the publication of the "Contributions to Conchology," an immense number of species have been discovered. In that work, and a paper published in the "Proceedings of the Boston Society of Natural History," (1845,) the

Professor described, of the Jamaica fauna, besides a large number of marine species, upwards of two hundred and fifty species of land and twenty of fresh-water shells, very few of which proved to have been previously known.

The descriptions are framed with the greatest care, the peculiarities of the species nicely distinguished, and their affinities discussed. As a remarkable example of critical investigation, we would refer to the Professor's "Analysis of the Group of Species of *Cyclostoma*, which is represented by *C. Jamaicense*, Chem." ("Contributions," pp. 140—148.)

In "Remarks on the Distribution of the Terrestrial and Fresh-water Mollusca which Inhabit Jamaica," ("Contributions," pp. 45—50, 1849,) the Professor comments on the great profusion of the terrestrial species, and their accumulation in certain districts. He says, that, of the 265 species enumerated in his Catalogue, more than 200 were collected by himself in a hasty exploration of one-tenth of the surface of the island, and that a collector, after becoming acquainted with their stations and localities, might easily obtain eighty or ninety species in one day.

The study of the Jamaica shells directed, at an early period, the attention of Professor Adams to the general questions of the limits, origin and distribution of species. He refers to the perplexities which arise in attempting to ascertain the limits of species from such facts as he observed in the group of *Helices* represented by *Helix sinuata*, several of which facts he thus specifies:—

"In some instances, the peculiarities of a local type, which differs but slightly from the typical species, are quite constant at the given place, but vary geographically, that is, are gradually lost in the more and more distant individuals. I am not aware that these examples are numerous.

"Not only does the amount of difference between the local types vary from that of well marked species to that of scarcely distinguishable varieties, but the individuals of a given locality, while preserving the peculiarities of the type, sometimes differ from each other in characters which appear to be as important, except in the want of constancy, as those which distinguish the local group." ("Contributions," p. 78, Feb., 1850.)

Subsequently the views of the Professor on these questions became more developed, and were published especially in his "Remarks on the Origin of the Terrestrial Mollusca of Jamaica," ("Contributions," pp. 85—87, March, 1850,) and in a paper entitled "On the Nature and Origin of the Species of the Terrestrial Mollusca in the Island of Jamaica," ("Contributions," pp. 189—194, Nov., 1851.)

In the former Professor Adams notices, that since the publication of his previous remarks, he had received an article* on the Geographical Distribution of Animals, by Professor Agassiz, and adds:—"Following so eminent an authority and safe guide, we need no longer hesitate to state the hypothesis, which was prepared with the remarks above referred to, on the *sinuata* group of *Helices*."

The Professor then remarks as follows:—

"The distribution of the terrestrial Molluscs in Jamaica (and probably of all Molluscs in all parts of the world) is most easily accounted for by the following hypothesis: that the introduction of the existing races was effected by the creation of many individuals, and that they were modeled after certain types, which were mostly local, and between which there existed, as at the present day, unequal differences, from those which merely distinguish individuals, to those of varieties, of species, of groups of species, of genera, &c."

. . . "If these views are correct, we cannot retain the prevalent theory that species are natural groups, but that genera and other groups are artificial. All groups are natural, so far as they are founded on actual types. Any groups are artificial, or, to speak more correctly and intelligibly, are arbitrary, in proportion as the differences between individuals, varieties, species, and the successively more comprehensive groups, present a series of an indefinite number of nearly equal degrees. In proportion to the equality of the degrees are the points at which we mark off species, &c., arbitrary."

. . . "It is obvious that an illustration of this subject may be found in the different species and varieties of mankind."

With regard to the foregoing hypothesis as to the distribution of the terrestrial Molluscs, Professor Adams, in the latter of the two papers above referred to, adds this additional explanation:—

"The proof of this proposition is found in the geographical distribution of the varieties. In the great majority of species, the varieties are so distributed, that the space which is occupied by one of them coincides with that of other two or more. Now, if the circumstances of locality had produced the local types by modifications of one original type of the species, then all the varieties which inhabit a locality should have been affected. In that case, all the varieties in any given place would have the same geographical limits. But the contrary more frequently occurs. Each variety has its own limits of distribution. If a few coincide in the boundary of their province, on the other hand one is often found to have an extent of distribution, which is equal to that of two or more other varieties. But such a geographical coincidence of one variety with several other varieties is inconsistent with any other theory than that of an original constitutional peculiarity of character in each variety. This inference is confirmed by the occasional intermingling in one locality of varieties, which differ from each other as much as those which occupy distinct regions. If, then, we assume the original independent creation of all the varieties, each originally represented by at least several individuals, the facts of distribution become explicable with the greatest facility.

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* The following extract from the article referred to, states the conclusions of Agassiz:—"And this is the view which we take of the natural distribution of animals, that they originated primitively over the whole extent of their natural distribution; that they originated there, not in pairs, but in large numbers, in such proportions as suits their natural mode of living and the preservation of their species; and that the same species may have originated in different unconnected parts of the more extensive circle of their distribution." ("Christian Examiner," Boston, March, 1850, p. 192.)

"The same statements might be made respecting entire species, and even groups of species and genera. Some are very local, and others, more widely distributed, occupy the ground of several local species."

The very local distribution of the terrestrial Mollusca in the West Indies* did not escape the attention of Professor Adams. In "Hints on the Geographical Distribution of Animals, with especial Reference to the Mollusca," ("Contrib.," pp. 207—215, Oct., 1852,) a paper which contains many original and suggestive remarks, he mentions that the terrestrial faunæ of Cuba, St. Domingo, Porto Rico and Jamaica, are distinct from each other; and that the same is true, to a great extent, of the West India Islands generally; that those of the Bahamas and Bermudas are also distinct. Jamaica, he says, "contains more known species of land Molluscs than the whole of North America, from the Isthmus to Melville Island."

Referring to the relations of the subject discussed in the paper in question, to theories of the origin of species and to geological reasoning, Professor Adams makes the following among other observations:—

"If large groups of such islands as the West Indies should be united in a common area of dry land, then, according to the theory which accounts for the facts of distribution by actual dispersion from centres, there would be zoological provinces containing five to tenfold as many species as any which now exist.

"The geological fact, that continents by submergence become islands, and that islands by emergence become continents, does not affect the foregoing reasoning, because such changes require an amount of time exceeding one geological period, during which time there is change of faunæ.

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* See paper "On the Geographical Distribution of the Genera and Species of Land Shells of the West India Islands, with a Catalogue of the Species of each Island." By T. Bland, Ann. N. Y. Lyceum, vii., 1861.

"Such insular faunæ as have been described in § 7 and § 13, prove that the islands which they inhabit have been geographically separate since an era anterior to the introduction of the existing species. But this conclusion does not depend on the assumption that the species would have dispersed themselves over several islands if they had not always been restrained by water; but on the fact that such small zoological provinces exist nowhere on continents.

"The occurrence of a very *few* identical species on different islands, or on islands and the mainland, does not prove the union of such land since the existence of the species, because such a distribution may have been caused by the accidents of dispersion, or by independent creation.

"The occurrence of many species common to different islands, in some parts of Polynesia, renders it probable that such islands have constituted one island since the existence of these species.

"The frequent occurrence of analogues and the prevalence of generic or subgeneric types in some islands do not prove the former union of these islands, but may indicate their greater proximity at a former period."

Professor Adams, in a paper from which we have already quoted, ("Contrib.," p. 50, 1849,) remarked:—

"With this extremely local distribution of the terrestrial Mollusca in the West Indies may be associated the great fact of their geological history—that these islands have, since the later Tertiary periods, been in the process of elevation,—that they are the harbingers of a future continent, unlike the groups in the Pacific, which are the remains of ancient continents. Coincident with these two general facts in the West Indies is also a third,—that their coral reefs are all fringing, and that coral lagoon islands are wanting."

It remains for us to notice the last, and, indeed, the most complete and valuable work published by Professor Adams—his "Catalogue of Shells Collected at Panama."

Professor Adams sailed from New York on the 13th of November, 1850, arrived at Panama on the 26th, and left it on the 4th of January, 1851, having had scarcely more than five weeks for making his collections; yet they amounted "to 38,920 specimens of 376 species of *Gasteropoda,* 2,860 specimens of 139 species of *Acephala,* and 50 specimens of 1 species of

Brachiopoda; total, 41,830 specimens of 516 species of Mollusks."

The two principal objects of the expedition were, to collect for the Museum in Amherst College, and "to ascertain with the certainty of personal observation, what and how many species of shells exist at Panama." Having formerly, the Professor remarks, in his "Introduction," "collected about 500 marine species in Jamaica, near the centre of the Caribbean Zoological Province, it was thought that a comparison of these authentic materials would not be without interest." A subordinate object was to make observations on the habits of the species, in respect of station.

The results of the expedition were read before the New York Lyceum of Natural History on the 10th of May, 1852, and published in the Annals of that Institution, Vol. V., pp. 229—549, and subsequently, but in the same year, as a separate work, under the title already mentioned. Dr. P. P. Carpenter, than whom no one is more competent to review with sagacity and in a just and liberal spirit the labors of other naturalists, comments, in his invaluable "Report on the Present State of our Knowledge with regard to the Mollusca of the West Coast of North America," ("Report of the Brit. Assoc.," 1856,) on the Panama Catalogue, and in terms far more authoritative than any which we could offer, of which the following is a short abstract, his language being, however, scrupulously adopted:—

"Professor Adams had before collected about the same number of marine species at Jamaica; and, holding the theory* that no species could be common to the two oceans, he was well qualified to detect any sources of error which might have militated against his own hypothesis. The very minute discrimination, also, to which he had accustomed himself in his researches among the land shells of Jamaica, would at once prevent him from confounding similar species. And as he visited no other spot than the shores of Panama, and the neighboring Island of Taboga, there is no danger of the admixture of specimens from different localities. In the work under consideration the author gives all his references from personal research: quotes every assigned habitat, with authorities (discriminating original testimony by the mark !); and, in addition to his own remarks, states the number of specimens from which he writes. He was not able to dredge, nor to make observations on the animals; but for the shore shells, including the minute species, there is scarcely any thing left to be desired. The author describes 157 as new species: of the value of many of these there will be two opinions. Professor Adams, in his work on Jamaica Shells, ('Contributions to Conchology,' pp. 84 *et seq.*,) gives up the common opinion that species are natural groups, while genera, &c., are artificial: and as he believes that there are different *species* as well as varieties of mankind, it is natural that he should distinguish as species of shells what others might consider varieties, and as varieties what may be accidents of growth. To the discerning reader, however, this does not interfere with the extreme value of the work. In a branch of inquiry so overburdened with carelessly observed or recorded facts, the freedom from the usual sources of error is a matter of the first importance. Where a species has originated in a mere theory, as in the case of common types from the two oceans, the student is at once on his guard. Where it arises from deficiency of materials, as in the *Cæca*, additional knowledge will soon set the error right. And in the present state of our ignorance, to designate forms as species which will hereafter have to be united, is much more pardonable than to overlook differences, all of which should be carefully noted before we can obtain a *natural* history of any single species. For the first great requirement in a scientific writer, patient and laborious accuracy, this, the last work of Professor Adams, (for he died in 1853,) stands in the very foremost rank. The new species are described in Latin, and with an accuracy which often makes it safer to identify shells from them alone, than from the showy plates and loose diagnoses of some works of the greatest pretensions."

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* "It is scarcely necessary to consider the question, whether any of the shells on the opposite sides of tropical America could have had a common origin. Although in some points the Caribbean Sea and the Pacific approach within forty or fifty miles in a direct line, it is difficult to imagine any adequate means of the intercommunication of living marine Mollusks." (C. B. Adams, in "Introduction to Panama Catalogue," p. 9.)

Mr. Carpenter, several years after the publication of his Report, visited America, and found that no steps had been taken to figure the unique specimens deposited in the Museum at Amherst, or to verify Adams' determinations of old species. Fortunately for the cause of science, Mr. Carpenter went to Amherst, and, with his accustomed care and fidelity, examined Professor Adams' Panama collection. The result, a "Review of Professor C. B. Adams' Catalogue of the Shells of Panama, from the Type Specimens," was published in the "Proceedings of the Zoological Society of London," (June, 1863.) Mr. Carpenter, in pointing out some errors in the diagnoses of small shells, and referring, among other things, to the incessant demands on the Professor's attention, from his multifarious duties at Amherst, precluding much time for original research, justly remarks:—"What he accomplished during his short life is marvellous. Had that life been spared to revise his works, the necessity for this friendly criticism would not have arisen."

With respect to the views entertained by Professor Adams, that no species could be common to the Atlantic and Pacific Oceans, it may be mentioned as an interesting fact, that he departed from his theory as regards *Crepidula unguiformis*, Lam.* As to this species the Professor observes:—

"This shell is well calculated to confound the popular notion of species. We have now before us many perfect specimens from Sicily, from Massachusetts, from Jamaica, and from Panama, all of which, with the exception of the Mediterranean shells, we collected in person."

"So far, at least, as the shells are concerned, it seems necessary to admit that they all may be comprised in one species; or to maintain that individuals, which cannot be distinguished from each other, belong to different species, because it is probable that they descended from distinct original stocks. But if we admit that each species in the animal kingdom was introduced by the creation of many original stocks, then the fact before us becomes intelligible and very uncommon in only one particular, viz: that the original individuals of a single species were created in very distant zoological provinces."—"Panama Catalogue," p. 231.

After the foregoing brief review of the work of Professor Adams on the Panama Shells, and reference to his opinions as to the origin and distribution of species, it will not be out of place to state the results of study and research devoted since his death to the subject of the Mollusca of the west coast of America.

Carpenter, in his before mentioned "Report" of 1856, enumerates 35 species "regarded as identical between the Pacific and Atlantic," 34 "which may prove to be identical," 41 "really separated, but by slight differences," and 26 species "analagous, but quite distinct," remarking, that probably those lists will hereafter be greatly extended.

The same author, in his "Supplementary Report," ("Report of Brit. Assoc.," 1864,) has some extremely valuable remarks with respect to the marine fauna of the west coast, some of which may thus, but in his own words, be shortly stated:—

"With regard to the tropical fauna, the researches at Cape St. Lucas and in the interior of the Gulf of California, though leaving much to be desired, bear out the general conclusions arrived at in paragraphs 78—87 (of the Report of 1856). The evidence for the identity of specific forms on the Atlantic and Pacific sides of Central America has been greatly confirmed.

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* See Carpenter's remarks in "Cat. of Reigen Collection, Brit. Mus.," 1855—7, p. 285, and in his "Review," referred to in the text.

Dr. Gould writes:—'The doctrine of local limitations meets with so few apparent exceptions, that we admit it as an axiom in zoology that species strongly resembling each other, derived from widely diverse localities, especially if a continent intervenes, and if no known or plausible means of communication can be assigned, should be assumed as different until their identity can be proved. (*Vide* "Expl. Exped. Moll. Intr.," p. xi.) Much study of living specimens must be made before the apparent exceptions can be brought under the rule.' It has, however, to be borne in mind that the researches of modern geolcgy clearly point to considerable alterations in the existing configuration of continents, and in the consequent direction of ocean currents during the ascertained period of many species now living. Nor are we warranted in the belief that the existing fauna in any locality has been created at any one time, or has radiated from any single spot. To study the relations of living shells simply in connection with the existing map of the world must lead but to partial results.

"It is interesting to observe, that, notwithstanding the probable connection of the oceans through the Rocky Mountains during the Miocene age, there is extremely little similarity between the special temperate faunas of East and West America. Not a single species has yet been proved identical, and the allied forms are but few in number.

"When, however, we approach the region in which boreal and sub-boreal forms occur, many species are found in common, and between others there is but slight difference. Yet even here there are more British than New England species in the west-coast fauna. As might be expected, the British species are, for the most part, those which are also found fossil, and, therefore, have had time to diffuse themselves widely over the hemisphere. It is, however, remarkable that many Crag species have reached Eastern Asia and West America, which are not found in Grand Manan and New England. It is also extraordinary that certain special generic forms of the Crag reappear in the North Pacific.

"The Vancouver and California districts have so many characteristic species in common, (111 out of 492,) that they must be regarded as constituting one fauna, differing as do the British and Mediterranean regions. One fact must, however, be here specially noted, viz: the great peculiarity of the island-fauna. Although the Sta. Barbara group are so near the mainland, the dredge has not only produced many species not known on the continent, but also many before considered as essentially tropical. Along with these are not only some species of types hitherto regarded as almost exclusively Asiatic, but also some which belong to the sub-boreal district,

—one of the latter belonging to the British, and not to the New England form.

"Of the blending of the temperate and tropical faunas on the peninsula of Lower California, we are still in ignorance. All we know is, that at Margarita Bay the shells are still tropical, and that at Cerros Island they are strangely intermixed. There is peculiar evidence of connection between the faunas of the peninsula and of South America, not only in the land-shells, but in some of the marine forms."

Mr. F. B. Meek, in his "Check List of the Miocene Invertebrate Fossils of North America," ("Smithsonian Miscel. Coll.," 1864,) has the following note regarding Dr. Carpenter's opinion as to the identity of Miocene shells of the Pacific slope with living species:—

"The extensive and critical knowledge of the living Mollusks of the Western Coast of North America, possessed by this able conchologist, renders his remarks on the relations of Tertiary and existing species of that region unusually interesting to the palæontologist. It is to be regretted, however, that his comparisons were, in most cases, necessarily made with very imperfect figures of the fossil species; the type specimens not being accessible at the time he was in this country. Hence, his suggestions that so large a proportion of the Miocene shells of the Pacific slope are, probably, identical with living species, should not be too hastily accepted. Particularly since the questions involved are of far greater importance than that of the mere specific difference or identity of certain forms, for, if wrongly decided, they may lead to very erroneous conclusions in regard to the age of these tertiary deposits; while they have a direct and important bearing on the discussions respecting the duration of specific types in time. Consequently, I have carefully compared the types of Mr. Conrad's Western Coast Tertiary species with their living representatives, in all cases where authentic examples of each were at hand, and give the results of these comparisons under each of the species in these notes.

"In most of these cases, it will be observed, I have arrived at the conclusion that the fossil shells are distinct species from the recent. This accords with the conclusions, in many cases, adopted by those who have, of late years, instituted careful comparison of the Miocene species formerly supposed to be identical with living forms."

DESCRIPTIONS OF TWO NEW SPECIES OF MONOCONDYLŒA.

BY JOHN G. ANTHONY.

MONOCONDYLŒA PEGUENSIS, Anthony.—t. 18, f. 3.

Description.—Shell smooth, rhombic-ovate, inequilateral, somewhat inflated, sub-biangular behind; substance of the shell thick; beaks rather prominent, eroded, but apparently not undulated; ligament short and thin; epidermis dark brown or nearly black, smooth over the umbones and on the anterior portion of the shell, but having the sub-truncate posterior portion nearly covered with distinct corrugated folds, more prominent near the hinge margin; cardinal teeth prominent, curved and slightly bilobed, particularly in the right valve; anterior cicatrices distinct and deeply impressed; posterior cicatrices confluent; dorsal cicatrices deeply impressed, placed in a curved line under the beaks; nacre light salmon color and very iridescent.

Dimensions.—Length 3·7 inches, breadth 2·4 inches, diam. 1·2 inches.

Habitat.—Pegu.

Museum Comp. Zoology, Cambridge, Mass. Cabinet of Hugh Cuming, London. Cabinet of G. W. Tryon, Jr.

Observations.—This species, recently received from Pegu, seems to differ essentially from all hitherto described species. It is of a somewhat rhombic form, has very distinct but rather distant lines of growth, which, however, become closer near the basal edge. The beaks are considerably eroded, but show no marks of any undulations there. From *M. crebristriata* it differs in being larger, more inflated, more elliptical in form, and the epidermis is smoother and darker in color; the nacre has a rich satiny lustre, which near the edge of the shell becomes of a highly iridescent hue. Four specimens only of this species were received, but they are very constant in character, and cannot well be mistaken for any other species.

MONOCONDYLŒA CREBRISTRIATA, Anthony.—t. 18, f. 1.

Description.—Shell rhombic, strongly striate, very inequilateral, depressed, bi-angular behind; substance of the shell rather thick; beaks not prominent, eroded, having no indication of any undulations at the tip; epidermis light brown, with occasionally broad green rays on the posterior slope; the umbones, and, indeed, the whole surface is covered with crowded, fine, crenulose striæ, which on the posterior slope are crossed at right angles with prominent, regular folds; cardinal teeth prominent, erect, bilobed in the left valve; anterior cicatrices deeply impressed, distinct; posterior cicatrices confluent and indistinct; dorsal cicatrices small, but distinct, and placed at the base of the prominent tooth in the left valve, while in the right valve they are less distinct and placed a little more posteriorly; nacre light salmon, iridescent.

Dimensions.—Length 2·1 inches, breadth 1·45 inches, diam. ·5 inch.

Habitat.—Pegu.

Museum Comp. Zoology, Cambridge, Mass. Cabinet of Hugh Cuming, London. Cabinet of G. W. Tryon, Jr. Cabinet of C. M. Wheatley.

Observations.—With *Monocondylœa Peguensis* herein described, came also several fine specimens of this interesting shell. At first they were supposed to be merely the young of *Peguensis*, but, on examination, were found to differ in many esssential particulars; they are uniformly more depressed, lighter colored, more regularly rhombic in form, and of less size; but the most prominent difference consists in the beautiful crenulose striæ of the present species, which are densely crowded over the whole surface of the shell, while *M. Peguensis* is remarkably smooth over all except the posterior slope, and there the rugose folds are broader and less numerous than in *M. crebristriata;* the lines of growth are also more numerous in *M. Peguensis,* generally about 8, while *crebristriata* has rarely more than 3.

DESCRIPTION OF A NEW EXOTIC MELANIA.

BY JOHN G. ANTHONY.

MELANIA GLORIOSA, Anthony.—t. 18, f. 2.

Description.—Shell ovate-conic, smooth, olivaceous; spire elevated, but abruptly decollate, exhibiting only four whorls, which are convex and quite broad; sutures very deep and distinct; lines of growth remarkably prominent, often amounting to varices, and with revolving striæ less prominent, but, nevertheless, distinct, decussating with them; aperture large, ovate, blotched with reddish-brown within; columella very much curved, thickened with a white callus, and forming, with the sinuous outer lip, a lengthened, but not very decided sinus at base.

Dimensions.—Length (as eroded) 2·5 inches, breadth 1 inch. Length of aperture 1 inch, breadth of aperture ·7 inch.

Habitat.—Pegu.

Mus. Comp. Zoology, Cambridge. Cabinet of George W. Tryon, Jr.

Observations.—Belongs to a group of which *M. herculea*, Gould, may be cited as an example, but is much larger, has never such regular folds as that species, nor are its concentric striæ so prominent as to form nodulous ridges as in *M. herculea;* it is probably one of the most ponderous species of the genus; the revolving striæ are more prominent near the sutures, and at the base of the shell they are also much crowded and more elevated.

DESCRIPTION OF THREE NEW SPECIES OF MEXICAN LAND SHELLS.

BY WILLIAM M. GABB.

CYLINDRELLA, Pfr.

C. REMONDII, Gabb.—t. 19, f. 10—13.

Description.—C. t. "*Pfeifferii*" similis; albida, elliptico-oblonga; apice subtruncata; anfractibus 12, 2½ lævibus, reliquis convexiusculis, dense et tenuissime oblique costatis, ultimo ad basim convexo; umbilico minuto; apertura subrotundata; perist. continuo, reflexo, parum incrassato. Long. ·44, lat. ·13.

Locality.—1½ leagues from Arivechi, Sahuaripa Valley, Sonora, Mexico. Sent me by M. Aug. Rémond.

My Cabinet. Cabinet of George W. Tryon, Jr.

Closely related to *C. Pfeifferii*, but smaller, with more minute striæ, there being nearly twice as many in the same space; the nuclear whorls are rounder, and the first three or four whorls below the nucleus are distinctly flattened above obliquely and subangulated just above the suture, while in *C. Pfeifferii* they are all very regularly rounded.

Accompanying the above were numerous specimens of *C. Pfeifferii* from the "Cerro de la Campana," near Hermosillo, Sonora.

HELIX, Linn.

H. (*Polygyra*) BEHRII, Gabb.—t. 19, f. 5—9.

Description.—H. testa "*acutedentata*" similis; discoidea, planulata; superne spira maxime depressa, infra umbilicata; anfractibus 5, oblique et transversim costatis; anfr. ultimo ad aperturam valde descendens, constricto; umbilico angusto, profundo; apertura obliqua, tridentata, labro incrasso; colore albo(?).

Locality.—I have had the opportunity of examining five specimens of this species, all from near Guaymas, Mexico. My specimens were sent me by Mr. Rémond.

My Cabinet. Cabinet of George W. Tryon, Jr.

The principal points of difference between this shell and *H. acutedentata* are in the mouth. The teeth are but three in number; one on the inner lip, similar to that of *acutedentata,* but more twisted, narrower and truncated more obliquely below; the second tooth is a mere tubercle on the inner margin of the outer lip; it is sometimes slightly prolonged, and with the apex pointing outwards; the last is a large and very oblique fold on the basal part of the mouth; this latter character is the most obvious one. There are no traces of the internal oblique ribs in the upper part of the mouth, so characteristic of both *H. loisa* and *H. acutedentata.* The umbilicus and lower aspect of the shell are very nearly identical with the above quoted species.

H. (*Polygyra*) ANILIS, Gabb.—t. 19, f. 1—4.

Description.—H. testa orbiculata; superne spira depressa; infra minute umbilicata; anfractibus 4—4½; anfr. ult. ad aperturam descendens, vix constricto; umbilico angusto, profundo; apertura obliqua; labio unidentato; labro marginato, edentato, reflexo.

Locality.—With the preceding.

My Cabinet.

Shell a little more convex than the preceding, spire nearly flat; whorls rounded, most prominent a little above the middle; under surface showing about 1½ volutions; umbilicus minute, but distinctly perforate; suture impressed; surface polished and microscopically striate; last whorl slightly descending near the aperture, and a little constricted behind the lip; aperture oblique, outer lip a little thickened and reflected, ends connected on the inner side by a slight callus, which bears a triangular pyramidal tooth, V shaped on its anterior face. Greatest diameter ·55 inch; height ·23 inch.

DESCRIPTIONS OF NEW EOCENE SHELLS, AND REFERENCES WITH FIGURES TO PUBLISHED SPECIES.

BY T. A. CONRAD.

MUREX, Lin.

M. ENGONATUS.—Pl. 20, fig. 10. Foss. Shells of Tert. Form., p. 30.

M. MANTELLI, Conr.—Pl. 20, fig. 11. Journ. Acad. Nat. Sciences, vol. vii., p. 154.

M. VANUXEMI,* Conr.—Pl. 20, fig. 4.

Description.—Fusiform; volutions 5; those of the spire angular in the middle, where there is a subspinose line, another line of equal size revolves below with a fine intermediate line; longitudinal ribs on the body whorl 7; whorls of the spire with close rugose revolving lines above the angle; body whorl with revolving squamose ribs and an intermediate squamose line; labrum thick, dentate within.

Locality.—Claiborne.

STREPSIDURA, Swainson.

S. LINTEA, Conr.—Pl. 20, fig. 1. Amer. Journ. of Conch., vol. i., p. 142.

S. LAQUEATA, Conr.—Pl. 21, fig. 1.

Locality.—Claiborne.

COCHLESPIRA, Conrad.

C. ENGONATA, Conr.—Pl. 21, fig. 12. Amer. Journ. of Conch., vol. i., p. 142.

C. BELLA, Conr.—Pl. 21, fig. 6.

Description.—Fusiform, turrited, whorls 10, with an acute reflexed subspinose carina, and crenulated revolving lines. Differs from *C. cristata*, Conr., in having fewer and coarser lines, and a more prominent carina.

Locality.—Texas.

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* This shell is erroneously referred to Proceed. Acad. Nat. Sciences, 1864, in the Eocene Catalogue.

TORTOLIVA, Conrad.

T. TEXANA, Conr.—Pl. 21, fig. 4. Amer. Journ. of Conch., vol. i., p. 143.

LÆVIBUCCINUM, Conrad.

L. PRORSUM, Conr.—Pl. 20, fig. 17. Fossil Shells of Tert., p. 45.

BUCCITRITON, Conrad.

B. ALTUM, Conr.—Pl. 21, fig. 9.

Description.—Ovato-conic; volutions 6 or 7; spiral whorls indented above, convex beneath, with 2 or 3 distant varices; a crenulated revolving ridge below the suture; back of body whorl cancellated; basal margin projecting beyond the columellar base; labium strongly striated; labrum reflexed with 6 transverse plaits; nuclear whorls entire.

Locality.—Texas. Dr. Francis Moore.

VOLUTILITHES, Swains.

V. INDENTA, Conr.—Pl. 21, fig. 10. Amer. Journ. of Conch., vol. i., p. 144.

V. IMPRESSA, Conr.—Pl. 20, fig. 3. *Ib.*, p. 144.

LUNATIA, Gray.

L. MARYLANDICA, Conr.—Pl. 21, fig. 11.

Description.—Suborbicular or subovate, volutions 5; spire short, whorls convex, subcontracted below the suture; labium with a callus on the upper part, reflexed over the umbilical margin; umbilicus moderate in outline, profound, showing most of the volutions.

CIRSOSTREMA, Morch.

C. CLAIBORNENSIS, Conr.—Pl. 20, fig. 12.

Description.—Whorl with profoundly elevated acute reflexed ribs; interstices with revolving, large, intermediate, fine striæ extending to the base.

Locality.—Claiborne, Alabama.

OBELISCUS, Humphrey.

O. PEREXILIS, Conr.—Pl. 20, fig. 2. Amer. Journ. of Conch., vol. i., p. 144.

CANCELLARIA, Lam.

C. TORTIPLICA, Conr.—Pl. 21, fig. 8. Amer Journ. of Conch., vol. i., p. 145.

C. ELLAPSA, Conr.—Pl. 20, fig. 8.

Description.—Short-fusiform, whorls 5, rapidly increasing in size; 3 prominent revolving lines on the penultimate volution; 2 or 3 distant varices on the penultimate and body volutions, the latter with longitudinal unequal ribs; nuclear whorls entire; aperture half the shell's length; labrum entire within.

Locality.—Texas. Dr. Francis Moore.

TORNATELLÆA, Conrad.

T. LATA, Conr.—Pl. 20, fig. 13.

Description.—Suboval, spire acute; whorls 5, convex; body whorl ventricose; ribs close and numerous; columella with 2 distant plaits.

Locality.—Alabama?

DENTALIUM, Lin.

D. DENSATUM, Conr.—Pl. 20, fig. 15.

Description.—Thick in substance, with numerous unequal, slightly raised lines, disappearing towards the base.

CHITON, Lin.

C. ANTIQUUS, Conr.—Pl. 20, fig. 7. Proceed. Acad. Nat. Sciences, vol. vii., p. 263.

C. EOCENENSIS, Conr.—Pl. 20, fig. 6. *Ib.*

CORBULA, Lam.

C. FILOSA, Conr.—Pl. 20, fig. 5. Amer. Jour. of Conch., vol. i., p. 145.

GOULDIA, Adams.

G. PYGMÆA, Conr.—Pl. 21, fig. 5. Amer. Jour. of Conch., vol. i., p. 139.

CYCLAS, Klein.

C. CURTA, Conr.—Pl. 20, fig. 14. Amer. Journ. of Conch., vol. i., p. 139.

DECRIPTIONS OF FIVE NEW SPECIES OF OLDER EOCENE SHELLS FROM SHARK RIVER, MONMOUTH CO., N. J.

BY T. A. CONRAD.

PLEUROTOMARIA, Defrance.

P. PERLATA, Conr.—Pl. 21, fig. 7.

Description.—Conical-depressed, rapidly widening to the base; periphery slightly carinated; body whorl very wide, flattened above; base convex-depressed, slightly indented on the submargin; umbilicus profound.

Locality.—Shark River, N. J.

This is the only Tertiary species known to occur in the eastern beds of this country. It is one of the largest of the genus, and approximates *P. supracretacea*, pl. 205, 1, 2 of D'Orbigny's Pal. Franc.

SURCULA, Adams.

SUBGENUS SURCULITES, Conrad.

S. ANNOSA, Conr.—Pl. 20, fig. 9.

Description.—Turrited; spire elongated; whorls angulated above the middle, with an impressed revolving line above the suture; whole surface marked with fine, revolving, wrinkled lines, becoming large and distinct towards the base.

Locality.—Shark River, N. J.

ACTEONEMA, Conrad.

A. PRISCA, Conr.—Pl. 21, fig. 3.

An imperfect cast, distinguished from *A. striata* by having much finer and more numerous revolving lines.

Locality.—Shark River, N. J.

YOLDIA, Morch.

Y. PROTEXTA, Conr.—Pl. 21, fig. 2.

Description.—Subequilateral, anterior side longest, posterior end truncated obliquely inwards.

Locality.—Shark River, N. J.

AVICULA, Klein.

A. ANNOSA, Conr.—Pl. 20, fig. 16.

An imperfect cast; very different, however, in shape from other Eocene species.

Locality.—Shark River, N. J.

The Shark River species are all casts in a coarse-grained, hard, green sand, and I have selected a few only of many species, as sufficiently striking in form or character to distinguish them from other shells.

REFERENCE TO THE PLATES ILLUSTRATING MR. CONRAD'S PAPERS.

Plate 20.

Fig. 1. STREPSIDURA LINTEA, C.—P. 210.
" 2. OBELISCUS PEREXILIS, C.—P. 211.
" 3. VOLUTILITHES IMPRESSA, C.—P. 211.
" 4. MUREX VANUXEMI, C.—P. 210.
" 5. CORBULA FILOSA, C.—P. 212.
" 6. CHITON EOCENENSIS, C.—P. 212.
" 7. " ANTIQUUS, C.—P. 212.
" 8. TORTIPLICA ELLAPSA, C.—P. 212.
" 9. SURCULA ANNOSA, C.—P. 213.
" 10. MUREX ENGONATUS, C.—P. 210.
" 11. " MANTELLI, C.—P. 210.
" 12. CIRSOSTREMA CLAIBORNENSIS, C.—P. 211.
" 13. TORNATELLÆA LATA, C.—P. 212.
" 14. CYCLAS CURTA, C.—P. 212.
" 15. DENTALIUM DENSATUM, C.—P. 212.
" 16. AVICULA ANNOSA, C.—P. 214.
" 17. LÆVIBUCCINUM PRORSUM, C.—P. 211.

Plate 21.

Fig. 1. STREPSIDURA LAQUEATA, C.—P. 210.
" 2. YOLDIA PROTEXTA, C.—P. 213.
" 3. ACTEONEMA PRISCA, C.—P. 213.
" 4. TORTOLIVA TEXANA. C.—P. 211.
" 5. GOULDIA PYGMÆA, C.—P. 212.
" 6. COCHLESPIRA BELLA, C.—P. 210.
" 7. PLEUROTOMARIA PERLATA, C.—P. 213.
" 8. CANCELLARIA TORTIPLICA, C.—P. 211.
" 9. BUCCITRITON ALTUM, C.—P. 211.
" 10. VOLUTILITHES INDENTA, C.—P. 211.
" 11. LUNATIA MARYLANDICA, C.—P. 211.
" 12. COCHLESPIRA ENGONATA, C.—P. 210.

DESCRIPTIONS OF NEW SPECIES OF MELANIA.

BY GEORGE W. TRYON, JR.

1. M. RETIFERA, Tryon.—t. 22, f. 4.

Description.—Shell rather thin, shining, turrited, narrow; with four somewhat convex volutions (remaining) gradually increasing in diameter towards the body whorl, closely encircled by narrow engraved spiral striæ; sutures distinct; aperture small, oval, somewhat produced below; labrum regularly curved, inner lip very much curved below; columella without deposit of callus. Shell chesnut-colored, with three narrow red bands, which are exhibited upon the interior of the aperture.

Dimensions.—Length (of largest specimen) 23 millimetres, breadth 9 mill.; length of aperture 10 mill., breadth 5 mill.

Habitat.—Hakodadi, Japan.

My Cabinet. Cabinet of Academy of Nat. Sciences. Cabinets of John G. Anthony and Chas. M. Wheatley.

Observations.—Rather a showy species for the genus, resembling the California type of Goniobases in general appearance. It does not very closely resemble any Oriental Melanians; perhaps its nearest analogue is *Boninensis*, Lea, which is similarly sculptured, but is a narrower species, duller in color and without bands. But very few Japanese Melanians have been described, and none of them are allied to this species.

2. M. BRUNNESCENS, Tryon.—t. 22, f. 1.

Description.—Shell shining chocolate-color or chesnut, with two darker revolving bands, rather narrow, turrited; whorls (four remaining) slopingly convex, with prominent growth lines, and close, slightly impressed revolving striæ, which become more distinct at the base of the shell; sutures well impressed; aperture obliquely oval, produced below; outer lip flexuous, inner lip receding below, and white.

Dimensions.—Length 28 millimetres, breadth 12 mill.; length of aperture 11 mill., breadth 7 mill.

Habitat.—Philippines. W. M. Gabb.

My Cabinet. Cabinet of Academy of Nat. Sciences.

Observations.—But two specimens of this shell are known to me. It belongs to a small group of species represented by the well-known *decollata*, Lam., *ferrea*, Reeve, *corporosa*, Gld., *Sinensis*, Reeve, etc. It may be readily distinguished from all of these by its much more brilliant coloring.

3. M. UNICOLOR, Tryon.—t. 22, f. 2.

Description.—Shell thin, narrow, subcylindrical, or pupæform, truncate; volutions (three remaining) very slightly convex, and increasing but little in diameter; sutures well impressed; surface thickly covered with narrow, deeply engraved spiral striæ, visible on the interior of the aperture; second and third whorls closely longitudinally ribbed; aperture narrow, ovate, slightly oblique, rounded below; outer lip flattened in the middle, perpendicular; color very light brown, or tea-color, not shining.

Dimensions.—Length 17 millimetres, width 6 mill.; length of aperture 6 mill., breadth 4 mill.

Habitat.—Tahiti. W. H. Pease, Honolulu, S. I.

My Cabinet. Cabinet of Academy of Nat. Sciences. Cabinets of Wm. Harper Pease, Chas. M. Wheatley, Isaac Lea, and John G. Anthony.

Observations.—Some time since, Mr. Lea handed to me a number of species of Tahitian *Melaniæ*, which he had received from Mr. Pease, requesting me to describe any that proved to be new. Among them I found several small specimens of this species, and fearing that they might not be full grown specimens, I wrote to Mr. Pease for further information. He promptly sent to me a number of well-grown shells, and wrote that he had several thousand specimens, all presenting great uniformity of size, color and sculpture. I, therefore, no longer hesitate in describing it as a new species.

It does not resemble any other Tahitian *Melaniæ*. The following additional species were sent to me, from the same locality, by Mr. Pease:—

M. gracillima, Gld., *incisa*, Rve., *corporosa*, Gld., *Plutonis*, Hinds, *lancea*, Lea, *scopulus*, Reeve.

4. M. MILLEPUNCTATA, Tryon.—t. 22, f. 3.

Description.—Shell rather thin, short, ovate-conical, apex obtuse, eroded; whorls four, rapidly increasing in diameter, the last globosely inflated. Surface covered with raised, rounded, spiral striæ, intersected on all but the last whorl by longitudinal ribs. Suture well impressed. Aperture rather small, oval, outer lip somewhat curved forwards, turning obliquely to the left at the base, columellar lip but slightly curved, perpendicular. Color light brown, with a few black, irregular, longitudinal streaks, and covered by innumerable light chesnut-brown punctations or dashes, very distinct within the aperture.

Dimensions.—Length 16 millimetres, width 10 mill.; length of aperture 7 mill., width 4 mill.

Habitat.—Amazon River.

My Cabinet.

Observations.—This shell is allied to *Melania Macappa*, Moric., *M. atra*, Rich., and more especially to *M. brevior*, Trosch. It is shorter and wider than the two former, and is of much lighter texture, and differs in color and markings from the latter. It is a very beautiful species.

Melania loricata, Reeve, (Monograph, f. 198,) = *Hemisinus olivaceus*, Behn, (Reeve Monog. Hemisinus, f. 12.)

DECRIPTIONS OF NEW SPECIES OF AMNICOLA POMATIOPSIS, SOMATOGYRUS GABBIA, HYDROBIA AND RISSOA.

BY GEORGE W. TRYON, JR.

1. AMNICOLA TURBINIFORMIS, Tryon.—t. 22, f. 5.

Description.—Shell ovate, turbinated, whorls very convex; sutures impressed, spire obtuse at apex; nearly four whorls; body large, well rounded, a little angulated on the periphery; aperture wide ovate; umbilical opening narrow. Color dark green, light blue within the aperture.

Dimensions.—Length ·133 inch, diameter ·125 inch; length of aperture ·066 inch, diameter ·055 inch.

Habitat.—Crane Lake Valley, and Surprise Valley, N. E. California; and W. side of Stein's Mountains, S. Oregon. Wm. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This small species resembles *A. Cincinnatiensis*, Anth., very much in general appearance. The principal points of difference are, that this is a smaller, more solid species, with rather shorter spire, smaller umbilicus, and darker color; it differs also in the slightly angled periphery.

Mr. Gabb sent me a large number of specimens from the above localities.

2. AMNICOLA SIMILIS, Tryon.—t. 22, f. 6.

Description.—Shell ovately turbinated, whorls four, convex, spire moderate, apex obtuse, sutures well marked; body whorl well rounded, aperture ovate or pear-shaped, umbilicus moderately wide. Light horn color.

Dimensions.—Length ·135 inch, diameter ·120 inch; length of aperture ·6 inch, breadth ·42 inch.

Habitat.—Manilla. Wesley Newcomb, M. D.

My Cabinet. Cabinet of Dr. Newcomb.

Observations.—This shell resembles *A. turbiniformis*, herein described, but has a rather shorter, more obtuse spire, narrower aperture, and wider umbilicus.

GABBIA, nov. gen.

Description.—Shell like *Amnicola*, Gould and Hald. Operculum paucispiral, calcareous.

Station.—Fresh water.

3. GABBIA AUSTRALIS, Tryon.—t. 22, f. 7.

Description.—Shell small, globosely turbinated, consisting of four well rounded whorls, with distinct suture; spire elevated, convex, apex obtuse; lines of growth minute, crowded; aperture moderate, somewhat oblique, oval, a little accuminate above and below; umbilicus scarcely covered.

Dimensions.—Length ·25 inch, diameter ·185 inch; length of aperture ·125 inch, breadth ·1 inch.

Habitat.—New South Wales. Wesley Newcomb, M. D.

My Cabinet. Cabinet of Dr. Newcomb.

Observations.—A pretty shell, which does not resemble very closely any of the American species. The operculum is somewhat calcareous like *Bith. tentaculata.*

4. POMATIOPSIS INTERMEDIA, Tryon.—t. 22, f. 8.

Description.—Shell elongately turbinated, consisting of over four very convex whorls; spire elevated, suture profound, apex obtuse; body whorl well rounded; aperture small, nearly round; umbilicus narrow. Color dark green.

Dimensions.—Length ·18 inch, diameter ·12 inch; length of aperture ·06 inch, breadth ·053 inch.

Habitat.—Owyhee R., S. E. Oregon. Wm. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—The above description and measurement is from one of two or three adult individuals among the numerous specimens sent by Mr. Gabb. The species differs considerably when young.

Its form places it intermediate between *P. Nickliniana*, Lea, and *P. lapidaria*, Say.

5. SOMATOGYRUS AUREUS, Tryon.—t. 22, f. 9.

Description.—Shell subglobose, spire short, suture well impressed, apex obtuse; aperture pyriform, broadly rounded below; columellar lip slightly reflected and appressed, scarcely covering the umbilicus. Color golden yellow.

Dimensions.—Length ·18 inch, diameter ·16 inch; length of aperture ·13 inch, diameter ·11.

Habitat.—Tennessee River. Isaac Lea, LL.D.

My Cabinet. Cabinet of Mr. Lea.

Observations.—This species much resembles *S. integra,* Say, with which at first I had confounded it. My closer attention was directed to it on account of the difference of color. *Integra* has proportionally a smaller spire, and the whorls are not so well rounded, and, consequently, suture not so well impressed.

I received a number of specimens from Mr. Lea several years ago.

6. SOMATOGYRUS PARVULUS, Tryon.—t. 22, f. 10.

Description.—Shell very small, globose, rather solid, consisting of nearly four convex whorls; spire small, apex acute; body whorl well rounded, with aperture ovate, broadly rounded below; pillar lip slightly reflected, but not quite covering the umbilicus.

Dimensions.—Length ·12 inch, diameter ·10 inch; length of aperture ·085 inch, breadth ·075 inch.

Habitat.—Powell's River, E. Tennessee. S. S. Haldeman.

My Cabinet.

Observations.—This shell does not differ materially in aspect from *S. integra,* Say; with the same number of whorls, it is, however, much smaller, as well as proportionately more solid.

7. HYDROBIA CALIFORNICA, Tryon.—t. 22, f. 11.

Description.—Shell turbinated, consisting of six rather convex whorls; spire elevated, apex acute, suture well impressed; aperture moderate, ovate; umbilical region not perforate; epidermis minutely striated, polished, dark horn color; operculum thin, shining, dark brown.

Dimensions.—Length ·13 inch, diameter ·09 inch; length of aperture ·06 inch, breadth ·04 inch.

Habitat.—Oakland, and Martinez, California, in brackish water. Wm. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—Resembles somewhat *Rissoa minuta,* Totten. It is distinguished from all the other West Coast *Rissoidæ* by the absence of ribs.

8. HYDROBIA GLABRA, Tryon.—t. 22, f. 12.

Description.—Shell smooth, turrited, consisting of nearly seven convex whorls, with deeply impressed suture; spire long, acuminated, apex acute; aperture ovate, slightly oblique. Color light horn, or nearly white.

Dimensions.—Length ·18 inch, diameter, ·095 inch; length of aperture ·07 inch, breadth ·05 inch.

Habitat.—Bolivia. Wesley Newcomb, M. D.

My Cabinet. Cabinet of Dr. Newcomb.

Observations.—This species does not resemble very closely any of the South American Paludestrinæ described by D'Orbigny. It is a longer, narrower, lighter colored and more fragile species than *H. Californica,* nob.

9. RISSOA COOPERI, Tryon.—t. 22, f. 13.

Description.—Shell elongated, consisting of five rather flattened whorls, regularly diminishing to an acute apex, suture well marked; body whorl a little inflated, obtusely angled on the periphery; aperture small, oval. Color dark brown; surface smooth, not polished.

Dimensions.—Length ·125 inch, diameter ·07 inch; length of aperture ·055 inch, breadth ·04 inch.

Habitat.—San Diego, Cal., Salt Water Grass. Dr. J. G. Cooper.

My Cabinet.

Observations.—Differs from *Hydrobia Californica,* nob., in being narrower, more solid in its flattened whorls, and dull aspect. Some specimens are rimate.

DECRIPTIONS OF NEW SPECIES OF NORTH AMERICAN LIMNÆIDÆ.

BY GEORGE W. TRYON, JR.

PHYSA.

Until last year, very few American species of this genus were known, or rather none of our conchologists had investigated with sufficient care their specific characters; consequently, a number of distinct forms have long existed in our cabinets, under the name of *Physa heterostropha.* The specific characters in the *Physæ,* though not very marked, are really very constant, and, therefore, probably not only most of those species recently described by Mr. Lea,* and those herein described, will stand, but we may reasonably conclude that many yet uncharacterized species inhabit our waters.

1. PHYSA PROPINQUA, Tryon.—t. 23, f. 5.

Description.—Shell large, fragile, inflated; spire short, apex acute; body whorl almost shouldered, very large, covered with distinctly elevated lines of growth on the adult specimens; the surface frequently exhibits several planes, instead of being uniformly rounded; aperture large, oval, outer lip regularly rounded; columella a little twisted.

Dimensions.—Length 19 millimetres, diameter 13 mill.

Habitat.—Jordan Creek, S. W. Idaho. W. M Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This species has a shorter spire, its sutures are *not* well impressed, it has fewer whorls, is more ventricose, more solid, and is a smaller shell than *Ph. ampullacea* (*bullata,*) Gould. *Ph. Lordi,* Baird, is still more ventricosely inflated, and the columella is not twisted. *Ph. Traskii,* Lea, is a longer, more cylindrical species.

Mr. Gabb sent me nine specimens, of which several are adult.

* Proc. Acad. Nat. Sci., 1864.

2. PHYSA COOPERI, Tryon.—t. 23, f. 9.

Description.—Shell small ovate, rather solid, not inflated; body whorl somewhat flattened above the middle, and nearly the entire length of the shell; spire very short, eroded, suture not well impressed; surface roughly striate; columella nearly straight, without fold; lip bordered internally with red.

Dimensions.—Length 8 millimetres, diameter 4½ mill.

Habitat.—Spring in "Crane Lake" Valley, extreme N. E. corner of California. W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—I received a considerable number of this interesting little species; it can scarcely be compared with any other. It is peculiar for its small size, solid appearance and heavy deposit within the labrum. I dedicate it to the distinguished zoologist attached to the California State Geological Survey.

3. PHYSA SPARSESTRIATA, Tryon.—t. 23, f. 10.

Description.—Shell ovately cylindrical, spire rather produced, apex acute, suture well impressed; surface malleated, and covered with distant, sharp, raised growth-lines; texture quite fragile; outer lip not thickened; columella narrow, and turning somewhat to the right towards the base, very slightly, or not at all folded.

Dimensions.—Length 12 millimetres, diameter 7 mill.

Habitat.—San Joaquin Valley, California. W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This species somewhat resembles in its striæ *Ph. striata,* Lea, but does not otherwise accord with that shell. It is much more slender, more fragile, and has a longer spire than *Ph. heterostropha,* Say. In form it is somewhat like *Ph. virginea,* Gld.; but that is a smooth, polished species, of a richer color, frequently almost golden in hue. It is a very distinct shell of very constant character.

4. PHYSA DIAPHANA, Tryon.—t. 23, f. 11.

Description.—Shell smooth, oval, lengthened; spire of moderate length, suture impressed; body whorl four-fifths of the entire length, somewhat cylindrical, very fragile; growth-lines crowded, but minute; columellar lip very short, commencing low down, very much appressed, and much twisted to the right towards the base, polished, and very pearly.

Dimensions.—Length 13 millimetres, diameter 7 mill.

Habitat.—Oakland, California. Rev. J. Rowell.

My Cabinet. Cabinet of Mr. Rowell.

Observations.—Resembles *Ph. sparsestriata*, nob., in form, but is at once distinguished from that species by being smoother, with the growth-lines more crowded, and from that and all other *Physæ* by the very peculiar columella, which curves diagonally to the right at such an angle as to make it appear almost truncate. It is a pretty species, of medium size, which I received from Mr. Rowell two years ago. A number of specimens are before me.

5. PHYSA MALLEATA, Tryon.—t. 23, f. 14.

Description.—Shell cylindrical or lengthened oval, malleated, smooth, much polished, amber-colored; spire moderate, suture not well impressed; aperture somewhat ear-shaped, narrow above, wide and broadly rounded below; columella narrow, turned to the right, tinged with pink, as well as the outer lip.

Dimensions.—Length 12 millimetres, diameter 6½ mill.

Habitat.—Hell Gate River, Oregon. "Fandango Valley," a part of "Goose Lake Valley." W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This species does not very closely approach any of the preceding. *Ph. propinqua* is malleated, but with this, the resemblance ceases entirely. It is more closely related to the following, but differs in having the columella tinged with pink, in having a wider aperture, and a shorter spire. The two species come from far distant localities.

6. PHYSA DISTINGUENDA, Tryon.—t. 23, f. 6.

Description.—Shell variable in outline, sometimes cylindrical, sometimes more inflated, lengthened; spire somewhat longer than in the last species; whorls convex, suture well impressed; surface malleated, crowded with growth lines; aperture long and narrow, rather wider below; columella long and narrow, white, almost without fold, turned a little to the right below.

Dimensions.—Length 13 millimetres, diameter 7 mill.

Habitat.—Marysville and Stockton, California. Rev. J. Rowell.

My Cabinet. Cabinet of Mr. Rowell.

Observations.—The differences between this and the preceding species have already been pointed out. It is apparently very abundant, judging from the number of specimens communicated to me by Mr. Rowell. These differ somewhat in form, but the range of variation does not appear to be so great as that of *Ph. heterostropha* of the waters of the Atlantic and Middle States.

7. PHYSA POLITISSIMA, Tryon.—t. 23, f. 13.

Description.—Shell oval, spire very short, with the suture scarcely impressed; surface very smooth, highly polished; aperture moderate, ear-shaped; labrum regularly curved, not thickened internally; columella much indented at the insertion, scarcely folded, narrow, white, first vertical, then truncately turning to the right towards the base.

Dimensions.—Length 11 millimetres, diameter 6 mill.

Habitat.—Sacramento, California. Rev. J. Rowell.

My Cabinet. Cabinet of Mr. Rowell.

Observations.—This shell resembles more closely the British form which Dr. Turton called *Ph. alba,* than any other with which I am acquainted. In appearance it is singularly graceful and pleasing. Its very smooth, shining surface, unmarked by growth lines, and its indented columella, are the most prominent points of distinction from all our other species. Only a few specimens were received from Mr. Rowell; they were all of the size of the one herein described and figured.

8. PHYSA OCCIDENTALIS, Tryon.—t. 23, f. 8.

Description.—Shell very like *Ph. heterostropha*; whorls well rounded; suture impressed; spire moderate, sometimes short; apex acute; texture rather thin, surface crowded with growth lines, polished, amber colored; aperture moderately large, outer lip well rounded, thickened within and tinged with red; columella white, indented, somewhat folded, sharp edged, curved to the right and forwards into a sort of beak at the base.

"Animal mouse color, foot very slender, with the margins parallel, then regularly converging. When the animal is in motion, the foot reaches to the apex of the shell."—W. M. Gabb.

Dimensions.—Length 18 millimetres, diameter 11 mill.

Habitat.—San Francisco, Centerville, California. Rev. J. Rowell.

Fort Colville. Geo. H. Horn, M. D., U. S. A.

Fort Tejon, Clear Lake, San Geronimo Creek, Sta Clara Co., and Dry Creek, Butte Co., California; Umpqua River, and Warner's Valley, 50 miles east of Goose Lake Valley, S. Oregon. W. M. Gabb.

Observations.—This species, widely diffused throughout the Pacific States, appears to take the place of our *Ph. heterostropha*, with which it has been generally confounded. It may be readily distinguished from that shell, however, by the very different form of the columella, so profoundly indented above, and so sharp, twisted, and curving forwards towards the base. Viewed from the right side, the form of shell and columella forcibly remind us of *Limnæa emarginata,* Say.

9. PHYSA PRIMEANA, Tryon.—t. 23, f. 12.

Description.—Shell oval; spire but little elevated above the curve of the outline of the body whorl; apex rather acute; suture moderate; a little attenuated towards the base; aperture narrow, ear-shaped, broader and well rounded below; columellar lip turned a little to the right, but well rounded. A broad, but thin deposit of callus on the body whorl, connects the ends of the lip margin. Surface smooth, polished, amber-colored; lip margined, and together with the columella tinged with red.

Dimensions.—Length 9 millimetres, diameter 6 mill.

Habitat.—Long Island. Temple Prime.

My Cabinet. Cabinet of Mr. Prime.

Observations.—A beautiful little species, of which I received a number of specimens from various contiguous localities in Long Island. It is a more inflated species than *heterostropha,* and not shouldered like *ancillaria,* and is smaller than either of them. In size and outline it is very near to *Niagarensis,* but differs in color, texture, and in the direction of the columella.

10. PHYSA LATA, Tryon.—t. 23, f. 7.

Description.—Shell very fragile, light horn-color, waxy, irregularly striate; spire moderately elevated; whorls convex; apex acute; suture well impressed; body inflated; aperture rather large, columellar lip turned to the right, very narrow, distinctly folded.

Dimensions.—Length 10½ millimetres, diameter 7 mill.

Habitat.—Juniata River, at Hollidaysburg, Penna. Wm. M. Gabb.

My Cabinet.

Observations.—This species has very much the form of *Ph. heterostropha,* but is rather more ventricose, much thinner, and the surface exhibits a peculiar glimmering lustre. It is more like *Ph. osculans,* Hald., in its texture, color and lustre, but the latter is a much larger species.

LIMNÆA.

1. Limnæa Rowellii, Tryon.—t. 23, f. 1.

Description.—Shell elongate, narrow, consisting of six rather obliquely revolving whorls; spire somewhat attenuately lengthened; apex acute; suture not much impressed; aperture not half the length of the shell, oblique; columella with a distinct fold, turned to the left below, and appressed to the body the whole distance; surface rather smooth and polished; texture fragile.

Dimensions.—Length 25 millimetres, diameter 10 mill.; length of aperture 11 mill., width 5 mill.

Habitat.—San Francisco, California. Rev. J. Rowell.

My Cabinet. Cabinet of Mr. Rowell.

Observations.—This species resembles *L. attenuata*, Say, and *L. reflexa*, Say, more than any others. The first is much narrower, and the whorls are not so convex, while the latter is more elongate, more convex, and the aperture is narrower and turned back.

It is a very pleasing species, very graceful and modest in appearance.

2. Limnæa zebra, Tryon.—t. 23, f. 4.

Description.—Shell long, narrow, composed of 5½ slightly convex, very oblique volutions; suture well marked; aperture small, narrow, ovate, oblique; columella slightly folded, curving to the left; labium appressed to the body whorl for its entire length; umbilicus covered; labrum margined within; color light brown, variegated by double longitudinal, somewhat oblique white lines.

Dimensions.—Length 27 millimetres, diameter 8 mill.; length of aperture 11 mill., width, 4½ mill.

Habitat.—Minnesota. J. H. Slack, M. D.
Michigan. Prof. Manly Miles.
Milwaukee, Wis. Hon. I. A. Lapham.

My Cabinet. Cabinet of Mr. Lapham. Michigan State Collection.

Observations.—A very beautiful species. Prof. Haldeman has figured it* first, (Pl. 7, f. 2, 6,) as *L. umbrosa*, and afterwards, (Pl. 8, f. 1, 2,) as *L. reflexa*. It is a longer, narrower species than the first, and is very near to the last, but differs in the appressed columellar lip, covered umbilicus, and in its singular ornamentation. The specific characters appear to be very constant, as the differences between this and *reflexa* are the same, in specimens of each, from either of the above localities.

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* "Monog. of the Limniades."

3. Limnæa Gabbii, Tryon.—t. 23, f. 2.

Description.—Shell somewhat oval, with rather short, attenuated spire, acute at apex; whorls not much rounded; suture well impressed; body whorl proportionally large, but not inflated; aperture moderate, semi-oval, a little oblique; columella oblique, narrow, scarcely folded, appressed, covering the umbilicus; surface covered with very close, fine striæ.

Dimensions.—Length 13 millimetres, diameter 7 mill.; length of aperture 8 mill., width 3 mill.

Habitat.—Clear Lake, California. W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This shell very closely resembles *L. catascopium*, Say, but differs in several particulars: the spire is narrower and more attenuate, the body whorl is not so much inflated, the lines of growth are much closer and finer, the columella is different, and the aperture is narrow below, instead of being somewhat broadly rounded, as in *L. catascopium*. All the specimens received were the same size as the one figured.

4. Limnæa Binneyi, Tryon.—t. 23, f. 3.

Description.—Shell globosely inflated, spire moderate, convex; apex acute; suture impressed; aperture suboval, outer lip very convex, inner lip broad, folded, sharp-edged, not appressed to the body, and exposing a moderate umbilicus; surface shining, densely crowded with very fine striæ of growth.

Dimensions. — Length 19 millimetres, diameter 13 mill.; length of aperture 13 mill., width 6 mill.

Habitat.—Hell Gate River, Oregon. W. G. Binney.

My Cabinet. Cabinet of Mr. Binney. Cabinet of Smithsonian Institution.

Observations.—This shell is nearly related to *L. catascopium*, Say, but may be distinguished from that species at once by being more globosely inflated, more solid, larger, and by its columella.

L. emarginata is a larger, longer species, and differs by its truncate columella, exhibited when viewed from the left side.

5. Limnæa Brownii, Tryon.—t. 23, f. 15.

Description.—Shell very like a miniature *L. catascopium*. Say, being about half the size of that species; whorls 4½, rapidly increasing, well rounded; suture well impressed; spire moderate, apex acute; aperture widely ear-shaped, columella thickened, flattened, appressed to the body whorl, and covering entirely the umbilicus, strongly folded, and indented above; texture of shell quite solid; light horn color.

Dimensions.—Length 9 millimetres, diameter 6 mill.; length of aperture 6 mill., width 3 mill.

Habitat.—Elysia, Ohio. A. D. Brown.

My Cabinet.

Observations.—There is no American species with which this is likely to be confounded, being unusually solid for the genus and for its size. It was sent to me as *L. caperata*, Say, which it certainly is not. The columellar fold is much more strongly developed in this species than any others of the *catascopium* group.

ANCYLUS.

1. Ancylus altus, Tryon.—t. 22, f. 15.

Description.—Shell somewhat oblong, broadly rounded at one end, more narrowly so at the other; convexly much elevated, apex obtuse, subcentral; texture delicate, surface rather smooth.

Dimensions.—Length 8 millimetres, breadth 6 mill., height 4 mill.

Habitat.—Klamath River. W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This shell is larger, narrower, more elevated, and not so solid as Prof. Haldeman's *A. crassus*, and it does not approach in outline to either of Mr. Lea's new West Coast species, both of them being more narrowly elongate. It is one of our largest species.

2. Ancylus subrotundatus, Tryon.—t. 22, f. 14.

Description.—Shell large, very fragile, oval, nearly round; convex, but little elevated; apex obtuse, nearly central.

Dimensions.—Length 8 millimetres, breadth 6½ mill., height 3 mill.

Habitat.—Umpqua River, Oregon. W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—This species, in being large and flat, resembles *A. patelloides*, Lea, but that shell is much longer, with sides more flattened. I received several specimens, of which the largest is figured.

PLANORBIS.

1. PLANORBIS HORNII, Tryon.—t. 22, f. 16.

Description.—Shell large, consisting of three convex volutions; aperture almost orbicular, not oblique, nor extending above or below the plane of the whorls; labrum slightly reflected, thickened within, and approaching so as nearly to connect on the body whorl; lines of growth fine and close. Color light horn.

Dimensions.—Height 7 millimetres, diameter 21 mill.

Habitat.—Fort Simpson, British America. Dr. George H. Horn.

My Cabinet.

Remarks.—A very beautiful species, distinguished from all other American forms by its very regular volutions, equally convex above and below, and the rotundity of the aperture. The initial volutions are larger in proportion to the ultimate whorl than in *Pl. trivolvis*, so that they are not much depressed below the plane of the surface when viewed either from above or below. There are three volutions.

2. PLANORBIS OREGONENSIS, Tryon.—t. 22, f. 17.

Description.—Shell very like to *Pl. trivolvis*, but whorls more rapidly increasing in volume; aperture oblique, earshaped, very much expanded, extending above and below the plane of the volutions; texture thin; striæ not very close, coarse, and irregular. Color dark horn.

Dimensions.—Height 4 millimetres, diameter 9 mill.

Habitat.—Pueblo Valley,* 15 miles south of Camp Alvord, on the boundary between Oregon and Nevada, and 60 miles west of the east boundary of Oregon. W. M. Gabb.

My Cabinet. Cabinet of Mr. Gabb.

Observations.—Resembles much a miniature *trivolvis*, but may be distinguished by its much more rapidly increasing volutions, and disproportionally large aperture, conjoined with its rugose striæ. A large number of specimens are before me, nearly all of the same size as the type figured.

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* "From a thermal spring, water above blood-heat. In the same spring were some aquatic beetles, (*Dytiscus*,) and extensive growth of Conferva, and swimming on the surface were two species of water birds." —Mr. Gabb's Letter.

REMARKS ON THE GENERA MONOCONDYLŒA, D'ORB., AND PSEUDODON, GOULD, WITH A SYNOPSIS OF THE LATTER.

BY T. A. CONRAD.

The genus *Monocondylœa,* D'Orbigny, is composed of a small group of Unionidæ which exclusively inhabits the waters of South America. Several Asiatic forms have lately been associated with them, which have a different external form and character and a dissimilar hinge, excepting that they possess only one cardinal, and no lateral teeth, and might as well be referred to *Margaritana*, Schumacher, as to *Monocondylœa.* D'Orbigny remarks of the latter genus, that "it has an aspect quite peculiar, by which it is immediately known." This, I suppose, refers to its external aspect, which is sufficient to distinguish the genus from the other forms of Unionidæ. It is one of those peculiar South American groups, which form so marked a feature of the Unionidæ of that continent, as strictly limited to it as *Triquetra*, *Castalia*, or *Iridea,* or as *Pleiodon* to Africa. D'Orbigny's description of the hinge is as follows:—"Dents cardinales non rentrante, formée d'un seul tubercle à chaque valve, s'applicant l'un au-dessus de l'autre, celui de la valve gauche étant au-dessus, celui de la valve droite au-dessous des crochets; le contraire existe quelquefois."* Dr. Gould describes the Asiatic group under the name of *Pseudodon,* with the following diagnosis:—"Hinge margin with a tooth-like apophysis on each valve, the surface of which is not fractured, but smoothly covered with enamel fitting into corresponding undulations in the opposite valve, that of the right valve closing in front of the left;" this last character is reversed in *Monocondylœa*, the tooth of the *left* valve being under the beak, and that of the right valve anterior to it. This group is of an elliptical, trapezoidal or rhomboidal outline, wholly unlike the obtusely-ovate, ventricose shape of *Monocondylœa,* with its prominent beaks and excavated anterior dorsal margin.

Another distinct form is *Monocondylœa Mardinensis,* Lea, from the River Tigris. This has an outline approaching *Mar-*

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* This must be rare and exceptional, as in all D'Orbigny's figures of six species the normal character is represented of the cardinal tooth being situated under, or posterior to the apex.

garitana margaritifera, being medially contracted, and of an oblong or leguminous shape. The cardinal tooth in the right valve is pyramidal and recurved, wholly unlike the transverse, compressed tooth of *Pseudodon*. For this shell I propose the name of

LEGUMINAIA, Conrad.

L. MARDINENSIS.

Monocondylœa Mardinensis, Lea.

TRIGONODON, Conrad.

Oval, somewhat compressed, with a prominent triangular cardinal tooth in each valve, with a deep pit behind it for the reception of the tooth of the opposite valve.

T. CREBRISTRIATA.

Monocondylœa crebristriata, Anthony.

CATALOGUE OF THE GENUS PSEUDODON, GOULD, 1844.

(MONODONTINA, CONRAD, 1852.)

P. CAMBOJENSIS, (*Monocondylœa*,) Petit. Cambodia.
P. COMPRESSA, (*M.*,) Lea. Siam.
P. CUMINGII, (*M.*,) Lea. Cambodia.
P. EUPHRATICA, (*U.*,) Bourg. Syria.
P. INOSCULARIS, Gould. Burmah.
P. MANHOTI, (*M.*,) Lea. Cambodia.
P. PLANULATA, (*M.*,) Lea. Java.
P. MITCHONII, (*M.*,) Bourg. Syria.
P. SALWENIANA, Gould. Burmah.
P. SAULCYI, (*U.*,) Bourg. Syria.
P. TRIPOLITANA, (*U.*,) Bourg. Syria.
P. WHEATLEYI, (*M.*,) Lea. Syria.
P. VONDEMBUSCHIANA, (*M.*,) Lea. Java.

DESCRIPTION OF A NEW GENUS OF UNIONIDÆ.

BY T. A. CONRAD.

ARCONAIA, Conrad.

Elongated, bent or bow-shaped; hinge with two distant, oblique, robust, short cardinal teeth, finely rugoso-striate; lateral teeth elongated, minutely rugoso-striate.

ARCONAIA LANCEOLATA.

This shell has been well figured and described by Lea, under the names of *Triquetra contorta* and *lanceolata*, the latter name having priority. The genus *Triquetra*, Klein, (*Hyria*, Lam.,) is a very dissimilar shell exteriorly from the former, and is peculiar to South America, whilst the other is limited to China. But, however dissimilar the exterior of the two shells, the hinge is more so. Instead of the long, compressed cardinal teeth of *Triquetra*, single in one valve, double in the other, we find in *Arconaia* two comparatively short, robust teeth, the posterior tooth of the left valve broad and prominent, where in *Triquetra* there are numerous small, close-set, radiating, compressed teeth, giving a widely different aspect to the hinge when compared with *Arconaia*. Another difference may be remarked in the posterior muscular impression, which is remote from the posterior margin, and of an oblong-oval shape, the long diameter nearly parallel with the shell's length. In *Triquetra* it is submarginal, large, and long in the direction of the shell's height.

DESCRIPTION OF A NEW SPECIES OF HELIX.

BY WESLEY NEWCOMB, M. D.

HELIX (*Macrocyclis*,) VOYANA, Newcomb.—t. 25, f. 4.

Description.—H. testa late umbilicata, depressa, pallida cornea, minute oblique striata, parum nitida, sub-diaphana; spira obtusa, sub-planulata; anfr. quinque, convexis, ultimus latus, declivatus, antice sub-descendens; apertura sinuato-truncato-ovalis; peristomate reflexiusculo, juncturam superiorem angulato, antice valide sinuoso decumbente, cum laminâ prominente connectante.

Dimensions.—Diam. maj. ·50, min. ·40, alt. ·20 pol.

Habitat.—Canyon Creek, Trinity Co., California (Voy.)

Shell broadly umbilicate, depressed, pale horn-color, minutely obliquely striate, slightly shining, translucent; spire obtuse, nearly on a plane; whorls 5, convex, the last large, and shelving down, in front slightly descending; aperture sinuate, truncately ovate; lip a little reflexed, angulated at its juncture with the body whorl above, farther forward strongly bent down, a strong plait or elevated ridge on the body whorl connecting the outer and inner lips.

Remarks.—This little shell bears the nearest relationship to *H. Vancouverensis*, Lea, (*vellicata*, Forbes,) of any other species inhabiting the Pacific coast. It is found in the same neighborhood with that species, which there attains its normal Oregon size, differing in this respect from its diminutive developement in the neighborhood of San Francisco, specimens of which have been distributed under the erroneous name of *H. sportella*, Gould.

It differs from that species in the curious development of the aperture, which is a constant character in adult specimens, and in its comparatively small size.

REVIEW OF THE GONIOBASES OF OREGON AND CALIFORNIA.

BY GEORGE W. TRYON, JR.

The most striking facts connected with the geographical distribution of the *Melanians* of the United States, I have enumerated in a paper published in the Second No. of this Journal. It will be remembered that mention is there made of the very small number of species inhabiting the States west of the Rocky Mountains; there appears to be about eleven species —less than three per cent. of the total number of American *Strepomatidæ.* When the territory of our Pacific States shall have been more fully explored, doubtless other forms will be added to their Melanian fauna, but still enough is known to sssure us of their comparative paucity in this region.

The species enumerated in this paper, were all collected either in the Columbia River, of Oregon, or the Sacramento and Klamath Rivers, of California, and their tributaries; therefore, Southern California has, as yet, yielded no species. Should any be discovered there, they will, in all probability, prove to be undescribed.

It is a curious fact that most of these shells bear a close analogy with some of the Pacific Island and Indian forms, in their shape and sculpture.

Thus, our *G. rudens*, Rve., is very like *Mel. Boninensis*, Lea, or *Mel. unicolor,* nob. There is, moreover, a certain similarity of form, ornamentation, and texture, pervading the whole group, which widely separates them from the Eastern American species.

The tendency to plication of the upper whorls, appears to pervade all of these. In nearly *every* species, even those described as smooth, individuals occur, in which the ribs are developed on the upper whorls. None of the species are entirely without revolving striæ; they are sometimes obsolete, but never entirely lost.

I am indebted to the liberality of Prof. Jos. Henry, Secretary of the Smithsonian Institution, for the use of the figures illustrating the following descriptions:

1. GONIOBASIS OCCATA, Hinds.—t. 24, f. 1, 2.

Description.—"Shell ovate, elongate, lutescent; whorls few, rounded, grooved, intermediate ridges narrow, acute; spire eroded above the fourth whorl; aperture caerulescent.

Habitat.—River Sacramento, California.

The rounded whorls are ploughed into numerous furrows, and the intervening ridges are comparatively narrow and keel-shaped; the lower part of the aperture is somewhat dilated, and slightly disposed to elongate in the manner of *Io*."

Mr. Reeve, and Dr. Brot following him, have fallen into the error of quoting *Shastaensis* as a synonym, through that prolific source of error, "an authentic specimen." The two species are really widely separated in form and ornamentation. The figure of "*Shastaensis*" given by Reeve, from a specimen in the collection of Mr. Cuming, is finer than any specimen of *occata* that I have seen.

Fig. 1 represents the usual form of this species; fig. 2 is a copy of the original figure of Hinds' description.

It will be noticed that in the above description no mention is made of the elevation of the revolving ridges into irregular, sharp tuberculations. A large series of specimens before me, shows that this tendency to crowded tuberculation gradually disappears as the specimens are selected that are longer and narrower, and in shells of the dimensions of Mr. Hinds' they are entirely wanting. Another curious variation is in the suture, the whorls of the short, obese specimens being bulged out, as though the shell was forcibly compressed in its length, and the suture is deep and well marked; in the longer shells, the whorls are flatter, and the suture indistinct. The lines of growth are very regular, and generally distinct, interrupted by the revolving ridges. As the substance of the shell is thin, the ridges cause corresponding sulcations on the inner surface of the whorls.

No variation of color is exhibited in any of my specimens, and none of them are banded.

The form of this species varies from length 1, diameter $\frac{1}{2}$ inches, to length $1\frac{3}{8}$, diameter $\frac{1}{2}$ inch; but the apicial whorls being generally eroded, the shell appears proportionally stouter.

Has been obtained only in the Sacramento River.

2. GONIOBASIS PLICIFERA, Lea.—t. 24, f. 3, 4, 5, 6.

Description.—"Shell acutely turrited, rather thick, nearly black; spire full of folds; apex truncate; whorls somewhat convex, the last being smooth above and striate below; aperture white.

Habitat.—Wahlamat, near its junction with the Columbia River. Prof. Nuttall.

Dimensions.—Diameter ·4 inch, length 1·1 inches.

Remarks.—Among the fine shells brought by Prof. Nuttall from beyond the Rocky Mountains, was this single species of *Melania*. It is remarkable for its numerous folds, or ribs, which fill the superior whorls. The inferior whorl is entirely without these ribs, but the inferior portion is furnished with transverse striæ. I am indebted to Prof. Nuttall for many specimens of this shell, all of which are more or less truncate at the apex. The most perfect one, which is small, has nine whorls."

The shell described by Mr. Lea is only one of several varieties (?) of form assumed by this species. It is characterized by flat whorls, slight suture, and particularly by the body whorl being free from ribs, and slightly angulated at the periphery. (Fig. 3.) Fig. 384 of Reeve's Monograph of Melania represents this variety.

Dr. Gould (Expl. Exped. Shells, p. 143,) remarks that "This shell seems to be subject to great variety, or else there are several allied species."

After an examination of a large number of specimens, we have selected two other forms, which we propose to designate as *varieties*, with names, for the present. All the specimens examined appear to be included in these three forms.

Var. OREGONENSIS.—Shell very long, sub-cylindrical, whorls very convex, plications slight on the body whorl, which is not angulate at the periphery. The whole surface is thickly covered with revolving striæ. (Fig. 4.)

Var. BULIMOIDES.—Shell short, inflated; whorls very convex, with plications on all of them; either covered with close revolving striæ, (Fig. 5,) or the striæ obsolete, (Fig. 6.) Fig. 164, Gould's Expl. Exped. Shells, represents this variety.

Of these forms, *Oregonenis* appears to be by far the most common, embracing near nine-tenths of the specimens before me, the balance being about equally divided between the other two.

Measurements of good specimens of each, are as follows:—

G. plicifera.—Length 1¼ inches, diameter ⅜ inch.
" *Oregonensis.* " 1½ " " ½ "
" *bulimoides.* " 1 " " ½ "

The color varies from light burnt brown, through various shades of yellow to light green, (the latter very rare,) and internally is blue, white, or very rarely purple. A single specimen is internally marked with purple lines, corresponding with the external revolving striæ. The substance of the shell being thin, the plications cause internal grooves; and in those specimens which are blue within, these grooves are pure white, curiously variegating them. The species is never banded.

Localities.—Hell Gate River, Washington Terr., a branch of Clark's Fork of the Columbia River, near the eastern boundary of the Territory. (Dr. J. G. Cooper.) Columbia River near its mouth. Willamette River, at Oregon City, and Eugene City, and near its junction with the Columbia. Lake George, Oregon. Nisqually River, Washington Territory.

It will be noticed, that the extent of distribution indicated above, is 900 or 1000 miles, which is far greater than usual with the species of *Goniobasis.*

3. GONIOBASIS RUDENS, Reeve.—t. 24, f. 7.

Description.—"Shell narrowly turriculated, dull olive; whorls rounded, constricted at the suture, spirally ridge-striated, the first strongly concentrically plicated; aperture small, rounded.

Habitat.—?

Strongly characterized by the constricted suture, and by the rib-like plications of the earlier whorls."

In my "Synonymy of Strepomatidæ," I considered this species a synonym of *silicula*, Gould, (*Shastaensis*, Lea,) but a more critical examination convinces me that it is distinct. The whorls are not so wide, are more convex, and are constantly covered with prominent revolving striæ, and without the broad colored band so characteristic of *silicula.* Some of the specimens from Columbia River are tinged with pink in the aperture, and faintly two to three banded. But the bands are not visible on the outside. The color of this species is always a light burnt-brown. None of the specimens are ribbed on the body, or the next whorl above it. The mouth is of curious form, rather rounded-triangular, generally nearly, if not quite as wide as its length, and very small in proportion to the size of the shell.

Dimensions.—Length (eroded) 4-5 inch, breadth 1-3 inch.

Localities.— Columbia River, Oregon; and Sacramento River, Cal.

4. GONIOBASIS SILICULA, Gould.—t. 24, f. 8, 9.

G. Shastaensis, Lea.

Description.—"A small, slender, nearly cylindrical species, covered with a somewhat clouded dark chesnut epidermis. There are about four entire whorls, several others being lost from the tips; they are well rounded, and marked with numerous fine, revolving threads, and all but the two largest ones are longitudinally plaited. The aperture is small, rounded-ovate, scarcely produced in front, and about one-fourth the length of the shell. The throat has a pale violet tint. The last whorl has a dark and narrow band around it, just at the junction of the lip to it.

Dimensions.—Length ½ inch, breadth 1-5 inch.

Habitat.—Found at Nisqually, Oregon.

It resembles *M. proxima*, Say, which is less cylindrical, and without folds."

Melania silicula, Gould.—Fig. 8.

The following is Mr. Lea's description:

"*Melania Shastaensis*, Lea.—Fig. 9.

Description.—"Shell striate, subcylindrical, rather thin, dark horn-color, banded; spire elevated, folded at the apex; suture very much impressed; whorls convex; aperture small, ovate, white within; columella smooth, incurved and recurved.

Operculum ovate, the polar point being near the left side and below the middle.

Habitat.—Shasta and Scott Rivers, California, Dr. Trask; and Fort Umpqua, O. T., Smithsonian Institution.

Dimensions.—Diam. ·34 inch, length 1·05 inch.

Remarks.—Nearly thirty specimens of this species were kindly sent to me by Dr. Trask. The form and size of this species is very much the same as *Melania* (*Goniobasis*) *Virginica*, Say. It differs in the form of the aperture, in having but a single revolving wide band, and in being more cylindrical. The *Shastaensis* varies like the *Virginica*, in being very uncertain as to striation. Some of the specimens are covered with minute revolving striæ, while others are almost entirely destitute of them. In every specimen before me, there is a broad revolving brown band on the middle of the whorls, more or less distinct, and always with more intense color on the superior whorls. This band often becomes obsolete on the inferior whorls, but when that is not the case, it may be seen within the aperture also. A few of the specimens have the columella slightly purple. Every specimen in my possession has the apex eroded, so that the number of whorls cannot be with certainty stated. I should suppose the number to be nine or ten. Some of them are sufficiently perfect to show several upper whorls with regular folds. The aperture is probably rather more than one-fourth the length of the shell."

It will noticed at once, that the shell described by Dr. Gould is not adult. The striæ are not distinctly marked in this, as in the last species; for, although visible, still the surface is rather smooth and polished. The ribs are not developed on the last three or four whorls, but are found on several of the upper ones. The color is very constant, reddish-brown, and the broad black band almost always present, revolving on the periphery of the last whorl, and just above the suture on the spire. Within, the color is light to dark purple, exhibiting the band through the whorl.

A number of minute specimens are before me, showing the initial whorls, which are very convex, and strongly plicate; these whorls are always subsequently lost by erosion.

Mr. Reeve's figure and description of *G. Shastaensis* represent *G. occata*, Hinds.

5. GONIOBASIS BAIRDIANA, Lea.—t. 24, f. 10.

Description.—Shell folded, somewhat drawn out, dark brown, rather thick, single banded; whorls subattenuate, sharp-pointed; suture impressed; whorls eight, slightly convex; aperture rather small, ovately rhomboidal, whitish within, and single-banded; outer lip sharp, scarcely sinuous; columella bent in, somewhat thickened and very much twisted.

Habitat.—Columbia River at Fort George, Oregon. J. Drayton.

Dimensions.—Diam. ·26 inch, length ·66 inch.

Remarks.—In size, color and outline this is nearly allied to *Draytonii,* herein described, but may at once be distinguished by that species having no folds, and in being more convex in the whorls. It cannot be confounded with *Melania* (*Goniobasis*) *Newberryi* (nobis,) which is shorter, more inflated, and has two bands. The *Bairdiana* has five or six apicial whorls, furnished with close, regular, well formed perpendicular folds. The lower whorls have two or three very minute revolving striæ immediately below the suture, where the color is lighter. There is a disposition to thickening on the inner margin of the outer lip, and along this edge a little coloring of brown is observable. The aperture is nearly the third of the length of the shell. I have great pleasure in dedicating this interesting little species to my friend Spencer F. Baird, of the Smithsonian Institution, to whom I am greatly indebted for many kind services, and who has done so much for the advancement of the Natural Sciences of our country."

This little species is not so cylindrical in form as the preceding ones. I have seen no specimens save those collected at the original locality; all of these are remarkably uniform in size, form and coloring. *Gon. Draytonii*, Lea, inhabits the same region, but is very constantly distinguished by its whorls, peculiarly resembling a coiled rope, by its heavy texture, and dark interior. *Draytonii* also appears to be never plicate, and its spire, though equally attenuate below, is more obtuse at the apex.

6. GONIOBASIS DRAYTONII, Lea.—t. 24, f. 11.

Description.—"Shell smooth, conoidal, somewhat thick, dark chesnut-brown, without bands, or obscurely banded; spire somewhat raised; suture very much impressed; whorls about six, convex; aperture small, ovate, dark brown within; outer lip acute, slightly sinuous; columella very much bent in and twisted.

Operculum subrotund, thin, light brown, with the polar point well towards the middle on the left.

Habitats.—Fort George, Oregon. J. Drayton. Also at Walla.

Dimensions.—Diam. ·27 inch, length ·68 inch.

Remarks.—A number of these specimens were sent to me by Prof. J. Henry, Secretary of the Smithsonian Institution, having been collected by the late Mr. Drayton, and to his memory I dedicate it. It is allied to *Melania* (*Goniobasis*) *nigrina* (nobis), but is not so polished, and is a much thicker shell. Some of the specimens before me have a thickened outer lip, with a lighter margin. The deep color within is made by broad obscure bands. Some of the specimens have a white thickening in the interior at the base, and some have a lighter brown mark on the exterior at the base of the axis."

The suture is bordered below by a raised line, which causes it to appear almost canaliculate.

Besides the above localities in Oregon, I have specimens from Napa Co., Table Mt. Butte Co., and Clear Creek, Shasta Co., Cal. These specimens are all uniform in size and form; they are always very dark reddish-brown, the surface nearly devoid of polish, and intensely red-brown within.

I formerly considered *Gon. nigrina*, Lea, a synonym of this species,* but now believe them to be well distinguished by a difference of color and texture, and by other peculiarities.

7. GONIOBASIS NIGRINA, Lea.—t. 24, f. 12.

Description.—"Shell smooth, small, conical, rather thin, nearly black, polished; spire somewhat elevated; suture impressed; whorls regularly convex; aperture small, ovate, angular above, dark purple within; columella incurved, purple.

Operculum dark brown, the polar point being low down and near to the left margin.

Habitat.—Clear Creek, Shasta County, California. Dr. Trask.

Dimensions.—Diam. ·23 inch, length ·67 inch.

Remarks.—A number of good specimens, with their opercula, were sent to me by Dr. Trask. In form, size and color, this species is very like to *Melania semicarinata*, Say, from Georgia and South Carolina. It may be distinguished at once by not having the carination of that species, which is usually strongly marked. It is not quite so high in the spire, and the aperture is more rounded at the base. In all the specimens of *nigrina* which I received, the apex is worn off. In the half-grown ones I can see no disposition to carination or plication in the upper whorls. I should suppose that in perfect specimens, the number of whorls would be found to be about seven, and that the aperture would be about the third of the length of the shell. In some of the specimens there is a disposition to put on a few fine striæ, and in most of them there is a very small angular line running below the suture. I am not acquainted with Dr. Gould's *Melania silicula* and *bulbosa* from Oregon, described in Proc. Boston Soc. Nat. Hist., July, 1847; but from the descriptions, I have no doubt that they are different from both species herein described."

This species is not always so cylindrical in form, as described by Mr. Lea; in specimens from other localities, I find a number with perfect, acuminate spires. In these, the number of whorls is eight. None of these can be properly said to be plicate, one or two imperfect ribs being only occasionally developed in an individual, upon the apicial whorls. The color varies from very dark chesnut to dull greenish, and the interior color varies correspondingly. None are banded.

The species differs from *Draytonii*, in its thinner substance and greater polish, and may be distinguished at once from *Gon. Bairdiana*, by the absence of plicæ and of a band.

I have specimens also from Butte Co., and Napa Co., Cal.

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* "Synonomy of Strepomatidæ," species 207.

8. GONIOBASIS RUBIGINOSA, Lea.—t. 24, f. 13.

Description.—"Shell carinate, somewhat awl-shaped, rather thin, shining, reddish, obscurely banded; spire subattenuate; suture very much impressed; whorls about six, convex; aperture very small, subrhomboidal, pale reddish and obscurely double-banded within; outer lip acute, sinuous: columella slightly bent in and twisted.

Operculum broadly ovate, dark brown, with the polar point near the left margin above the base.

Habitat.—Oregon. W. Newcomb, M. D.

Dimensions.—Diam. ·27 inch, Length ·74 inch.

Remarks.—Two specimens only were sent to me by Dr. Newcomb. The four upper whorls are carinate, and a small thread-like line below runs parallel with the more raised one. The two obscure bands are near to each other and are in the middle of the whorl. In outline it is near to *Melania* (*Goniobasis*) *nigrina*, (nobis,) but it is a larger species, with a less polished surface and of a very much lighter color. It differs entirely in being carinate. In both these specimens the whorls are slightly depressed below the suture, which modifies the outer lip. One of the specimens has an obscure brownish spot inside at the base of the columella. The aperture is about two-sevenths the length of the shell."

Mr. Lea has neglected to mention, that the carinæ are represented on the body whorl by obscure lines above and below the periphery, with the surface somewhat flattened between them.

I have seen no specimens, except those in Mr. Lea's collection, which are eroded, but have very little doubt that the initial whorls of perfect specimens would be plicate, as they are in the other lengthened cylindrical species of Oregon.

9. GONIOBASIS CIRCUMLINEATA, Tryon.—t. 24, f. 14, 15.

Description.—Shell inflated, fusiform, thick, very dark greenish black, or dark horn color, without bands; spire elevated, apex acute; whorls 6 to 7, convex, the initial ones sometimes slightly folded, suture much impressed; body whorl well-rounded, obscurely many angled, the planes produced by irregular revolving raised lines; aperture small, oblique, ovate, or nearly rhomboidal, columella smooth, callously thickened, incurved and recurved; color within generally deep reddish-brown, sometimes white.

Dimensions.—Length 7-8 inch, diam. 3-8 inch; length of aperture nearly 5-16 inch. (Fig. 14.)

Habitats.—Mission San Antonio, Cal.; Shasta Co., Cal. W. Newcomb. Pit River, Cal. Dr. J. S. Newberry. Feather River, Cal. J. H. Thomson.

My Cabinet. Cabinet of Smithsonian Institution, Wesley Newcomb, M. D., and J. H. Thomson.

An immature specimen (Fig. 15) measures, length ⅝ inch, diam. ¼ inch.

Remarks.—This species is more ventricose than any of the preceding, and differs also in the angled surface of the body whorl. The number of raised lines varies from eight to twelve in the half-grown specimens; in the adults, all but the most prominent become obsolete.

The full-grown shells are a little constricted on each whorl, and a little lighter colored below the suture, on almost all of my specimens. The apices are slightly eroded, but sufficiently so to destroy entirely the plication frequently exhibited by younger shells.

10. GONIOBASIS NEWBERRYI, Lea.—t. 24, f. 16.

Description.—"Shell smooth, ovately conical, rather thin, dark brown, triple-banded, yellow below the suture; spire somewhat raised; suture much impressed; whorls six, inflated; aperture rather small, ovately rounded, whitish and banded within; outer lip inflated; columella whitish, incurved.

Operculum ovate, rather thin, dark brown, with the polar point near the inner inferior edge.

Habitat.—Upper des Chutes River, Oregon Territory. J. S. Newberry, M.D.

Dimensions.—Diam. ·30 inch, length ·64 inch.

Remarks.—This is a rather small species, very nearly allied to *Melania* (*Goniobasis*) *Taitiana* (nobis), from Claiborne, Alabama, but differs in being rather more inflated, of a darker color, and having three dark bands instead of four. The bands in *Newberryi* are broad and dark, sometimes running into each other, while the *Taitiana* has thinner ones of a lighter color. In some specimens of the latter, the bands are absent, but I have seen no specimen of the former without bands. These give a dark appearance to the shell, which is well relieved by the yellow margin under the suture. I have great pleasure in naming it after Dr. Newberry, the discoverer of it."

I have not seen any of this species except Mr. Lea's specimens. These are very uniformly banded; except in this respect, they are certainly extremely closely allied to *bulbosa*, Gould.

11. GONIOBASIS BULBOSA, Gould.—t. 24, f. 17.

Description.—"Shell small, conically oblong, shining, eroded, greenish-brown; spire of 2-3 rounded whorls (remaining); suture profound; aperture ovately rounded, scarcely effused.

Dimensions.—Long 1-2, lat. 9-20 poll.

Habitat.—Columbia River.

The whorls are very cylindrical, so as to appear like a succession of bulbs. It is much like *M. perfusca,* Anthony, but in that the whorls slope gently to the suture. A broken specimen shows that it often attains a considerable size."

This species is exactly similar in outline to Mr. Lea's *Newberryi,* but none of the specimens before me (including Dr. Gould's types) exhibit the slightest indication of bands, while Mr. Lea declares his species to be always banded.

The shell figured is the largest I have seen, and considerably exceeds the dimensions of Dr. Gould's type specimen.

CATALOGUE OF THE SPECIES OF LIMNÆA INHABITING THE UNITED STATES.

BY GEORGE W. TRYON, JR.

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1. Limnæa stagnalis, Linn.

Helix stagnalis, Linnæus.—Faun. Suecica, 2188. 1761.

L. jugularis, Say.—Nicholson's Encyc., 1st edit. 1816.
Binney's Edition, p. 42. 1858.
Haldeman, Monog. of Limniades, Part 3, p. 16, t. 4. 1841.
DeKay, Moll. N. Y., p. 74, t, 5, f. 81. 1843.

L. appressa, Say.*—Jour. Acad. Nat. Sciences, ii., p. 168. 1821.
Binney's Edition, p. 66. 1858.
Adams, Moll. of Middlebury, Vt. 1841.
Am. Jour. Science, xl., p. 267. 1841.
Shells of Vermont, p. 3. 1842.
Haldeman, Monog. of Limniades, Part 4, p. 18, t. 5. 1842.
DeKay, Moll. N. Y., p. 74. 1843.

L. speciosa, Ziegler.—Rossmässler, Iconog. Land & Süssw. Moll. i., p. 96, t. 2, f. 50. 1835.

Habitat.—Maine, Great Lakes, Canada, Minnesota, Wisconsin, Oregon. Fort Simpson, British America, (Coll. Tryon.)

2. L. lepida, Gould.

L. lepida, Gld.—Proc. Bost. Soc. Nat. Hist., vol. ii., p. 211. 1847.
Mollusca of Wilkes' Expl. Exped., p. 121, f. 141. 1852.

Habitat.—Lake Vancouver, Oregon, (Gould.)

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3. Neristoma ampla, Mighels.

L. ampla, Mighels.—Shells of Maine, Bost. Jour. Nat. Hist., vol. iv., p. 337. 1842.
Ditto, vol. iv., p. 347. 1842.
Proc. Bost. Soc. Nat. Hist., vol. i., p. 129. 1843.

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* Half-grown shell. *L. speciosa*, Zglr., is the same.

Habitat.—Maine, (Mighels.) English River, Canada. (Coll. Tryon.)

4. N. DECOLLATA, Mighels & Adams.

L. decollata, Mighels & Adams. Bost. Soc. Proceed., vol. i., p. 49. 1841.
Bost. Jour. Nat. Hist., vol. iv., p. 45, t. 4, f. 13. 1842.
Mighels, Catalogue Shells of Maine, Bost. Jour. Nat. Hist., vol. iv., p. 336. 1842.

L. catascopium, Say, (Part.) Haldeman.—Monog. Limniades, Part v., p. 52, t. 14. 1842.

L. speciosa, DeKay.—Moll. N. Y., p. 67. 1843.

Habitat.—Maine, (Mighels.)

5. N. COLUMELLA, Say.

L. columella, Say.—Jour. Acad. Nat. Sci., vol i., p. 14. 1817.
Ditto, vol. ii., p. 167. 1821.
Nicholson's Encyc., 3d edit., vol. iv. 1819.
Binney's Edition, p. 56, 65. 1858.
Potiez & Michaud, Galerie des Mollusques, p. 216, t. 22, f. 5, 6. 1838.
Gould, Invert. Mass., p. 215, f. 144. 1841.
Haldeman, Monog. Limniades, Part v., p. 38, t. 12. 1842.
DeKay, Moll. N. Y., p. 72, t. 4, f. 75. 1843.

L. chalybea, Gould.*—Am. Jour. Sci., vol. xxxviii., p. 196. 1840.

L. navicula, Valenciennes.—Recueil d'Observ. Zool., &c., ii., p. 251. 1833.

L. strigosa, Lea.—Philos. Proc., ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 12. Observ., vol. iv., p. 12. 1844.

L. acuminata, Adams.—Am. Jour. Sci., vol. xxxix., p. 374. 1840.

Habitat.—Maine to South Carolina, and westward to Iowa. Lake Winnipeg.

6. N. MACROSTOMA, Say.

L. macrostoma, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 170. 1821.
Binney's Edit., p. 67. 1858.
Gould, Invert. Mass., p. 217, f. 148. 1841.

L. columella, Say, (Part.) Haldeman.—Monog. Limniades, Part v., p. 38, t. 12, f. 1—5. 1842.

Habitat.—Massachusetts to Pennsylvania.

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* A variety in "Invert. Mass.," p. 216, f. 145. 1841.

7. N. CASTA,* Lea.

L. casta, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 11. Observ., vol. iv., p. 11. 1844.

Habitat.—Poland, Ohio, (Lea.) Georgia, (Coll. Tryon.)

8. N. COARCTATA,* Lea.

L. coarctata, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 11. Observ., vol. iv., p. 11. 1844.

L. columella, Say, (Part.) Haldeman.—Monog. of Limniades, Part v., p. 38. 1842.

Habitat.—Newport, R. I., (Lea.)

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9. BULIMNÆA MEGASOMA, Say.

Limnæa megasoma, Say.—Narrative of Long's Expedition, p. 263, t. 15, f. 10. 1824.
Binney's Edit., p. 129, t. 74, f. 10. 1858.
Haldeman, Monog. of Limniades, Part 3, p. 13, t. 3, f. 1, 3. 1841.
C. B. Adams, Moll. of Middlebury, Vt. 1841.
Am. Jour. Sci., vol. xl., p. 266. 1841.
Shells of Vermont, p. 3. 1842.
DeKay, Moll. N. Y., p. 69, t. 4, f. 67. 1843.

Habitat.—North-West Territory, (Say.) Vermont, (Adams.) Michigan, (Coll. Tryon.) Canada, (Bell.)

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10. LIMNOPHYSA REFLEXA, Say.

L. reflexa, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 167. 1821.
Am. Conch., t. 31, f. 2. 1832.
Binney's Edit., p. 65 and 188, t. 31, f. 2. 1858.
Chenu. Bibliothèque Conchyliologique, vol. iii., p. 44, t. 7, f. 4.
Haldeman, Monog. Limniades, No. 4, p. 26, t. 8. 1842.
DeKay, Moll. N. Y., p. 71, t. 4, f. 65, 72.

L. elongata, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 167. 1821.
Narrative of Long's Exped., p. 263. 1824.
Binney's Edit., p. 65 and 130. 1858.

L. exilis, Lea.—Am. Philos. Trans., vol. v., p. 114, t. 19, f. 82. Observ., vol. i., p. 226. 1837.

Habitat.—W. New York to Wisconsin.

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* Doubtfully distinct from *columella*.

11. L. ZEBRA, Tryon.

L. zebra, Tryon.—Am. Jour. Conch., vol. i., No. 3, p. 228, t. 23, f. 4. 1865.

L. umbrosa, Say, (Part.) Haldeman.—Monog. Limniades, No. 4, p. 24, t. 7, f. 6. 1842.

L. reflexa, Say, (Part.) Ditto, No. 4, p. 26, t. 8, f. 1, 2. 1842.

Habitat.—Michigan, Wisconsin, Iowa.

12. L. ROWELLII, Tryon.

L. Rowellii, Tryon.—Am. Jour. Conch., vol. i., No. 3, p. 228, t. 23, f. 1. 1865.

Habitat.—California.

13. L. NUTTALLIANA, Lea.

L. Nuttalliana, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 9. Observ., vol. iv., p. 9. 1844.

L. fragilis, Linn., (Part.) Haldeman.—Monog. of Limniades, Part v., p. 53, t. 15, f. 1. 1842.

Habitat.—Oregon, (Lea.) San Francisco and Marysville, Cal., (Coll. Tryon.)

14. L. UMBROSA, Say.

L. umbrosa, Say.—American Conchology, t. 31, f. 1. 1832.
Binney's Edit., p. 188, t. 31, f. 1. 1858.
Chenu, Bibliothèque Conchyliologique, vol. iii., p. 43, t. 7, f. 5.
Adams, Moll. Middlebury, Vt. 1841.
Am. Jour. Sci., vol. xl., p. 268. 1841.
Haldeman, Monog. of Limniades, Part 4, p. 24, t. 7. 1842.
DeKay, Moll. N. Y., p. 68, t. 4, f. 76. 1843.
Gould, Mollusca, Wilkes' Expl. Exped., p. 122. 1852.

L. elodes, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 169. 1821.
Am. Conch., t. 31, f. 3. 1832.
Binney's Edit., p. 66 and 188, t. 31, f. 3. 1858.
Chenu, Bibliothèque Conchyliologique, vol. iii.. p. 44, t. 8, f. 3.
Gould, Invert. Mass., p. 221, f. 146—7. 1841.
C. B. Adams, Moll. Middlebury, Vt. 1841.
Am. Jour. Sci., vol. xl., p. 268. 1841.
Shells of Vermont, p. 3. 1842.

Habitat.—Canada, New York, Ohio, Indiana, Illinois, Missouri, Iowa, Wisconsin; Mountain Lake and Oakland, Cal., (Coll. Tryon.)

15. L. PALUSTRIS, Müller.

L. palustris, Müller.—Zool. Dan. Prodr. 2934. 1776.
Rossmässler, Iconog. Land und Süssw. Moll., vol. i., p. 96, t. 2, f. 51, 52. 1835.

L. fragilis, Linnæus. (sp.)—Faun. Suecica, 2187. 1761.
(Part.) Haldeman, Monog. of Limniades, Part 4, p. 20, t. 6, f. 7, 9. 1842.
DeKay, Moll. N. Y., p. 68, t. 4, f. 68. 1843.

Habitat.—W. New York; Michigan; Nebraska; Mountain Lake, Cal.; Laguna de los Cavallos, New Mexico, (Coll. Tryon.)

16. L. EXPANSA, Haldeman.

Limnæa expansa, Haldeman.—Suppl. to Part 1, Monog. of Limniades, p. 2. 1840.
Monog. of Limniades, Part 4, p. 29, t. 9, f. 6—8. 1842.
DeKay, Moll. N. Y., p. 75, t. 36, f. 348. 1843.

Habitat.—Vermont.

17. L. SUMASSI, Baird.*

L. Sumassi, Baird.—Proc. Zool. Soc. London. 1863.

Habitat.—British Columbia, (Baird.) Washington Territory. Oregon, (Coll. Tryon.)

18. L. HAYDENII, Lea.†

L. Haydenii, Lea.—Proc. Acad. Nat. Sci., p. 166. 1858.

Habitat.—Nebraska.

19. L. PROXIMA, Lea.

L. proxima, Lea.—Proc. Acad. Nat. Sci., vol. viii., p. 80. 1856.

Habitat.—Arroya San Antonio, Cal., (Lea.) Stein's Valley, S. E. Oregon, (Coll. Tryon.)

20. L. TRYONII, Lea.

L. Traskii, Lea.‡—Proc. Acad. Nat. Sci., p. 113. 1864.

L. Tryonii, Lea.—MSS.

Habitat.—Arroya San Antonio, Cal., (Lea.)

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* Probably only a variety of *Nuttalliana*, Lea.

† Doubtfully distinct from *Nuttalliana* and *Sumassi*.

‡ Name preoccupied by G. W. Tryon, Jr., Proc. Acad. Nat. Sci. 1863.

21. L. DESIDIOSA, Say.

L. desidiosa, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 169. 1821.
Narrative of Long's Expedition, p. 263. 1824.
American Conchology, t. 55, f. 3. 1834.
Binney's Edit., p. 66, 130 and 211, t. 55, f. 3. 1858.
Gould, Invert. Mass., p. 219, f. 150. 1841.
Adams, Moll. Middlebury, Vt. 1841.
Am. Jour. Sci., vol. xl., p. 268. 1841.
Shells of Vermont, p. 4. 1842.
Haldeman, Monog. of Limniades, Part 4, p. 31, t. 10. 1842.
DeKay, Moll. N. Y., p. 73, t. 5, f. 78. 1843.

L. Philadelphica, Lea.—Philos. Proc., vol. ii., p. 32. 1841.
Am. Philos. Trans., vol. ix., p. 8. Observ., vol. iv., p. 8. 1844.

L. fusiformis, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 10. Observ., vol. iv., p. 10. 1844.

Habitat.—New England to Virginia, and westward to Iowa.

22. L. OBRUSSA, Say.

L. obrussa, Say.—Jour. Acad. Nat. Sci., vol. v., p. 123. 1825.
Binney's Edit., p. 113. 1858.
DeKay, Moll. N. Y., p. 75. 1843.

L. acuta, Lea.—Am. Philos. Trans., vol. v., p. 114, t. 19, f. 81. Observ., vol. i., p. 226. 1837.

L. desidiosa, Say.—Haldeman, Monog. of Limniades, Part v., p. 48, t. 13, f. 16—18. 1842.

Habitat.—New England to Maryland. Oakland, Cal., (Coll. Tryon.)

23. L. BINNEYI, Tryon.

L. Binneyi, Tryon.—Am. Jour. Conch., vol. i., part 3, p. 229, t. 23, f. 3. 1865.

Habitat.—Hell Gate River, Oregon, (Tryon.)

24. L. EMARGINATA, Say.

L. emarginata, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 170. 1821.
Narrative of Long's Exped., p. 263. 1824.
Am. Conch., t. 55, f. 1. 1834.
Binney's Edit., p. 67, 130 and 211, t. 55, f. 1. 1858.
Haldeman, Monog. of Limniades, Part 3, p. 10, t. 2. 1841.
DeKay, Moll. N. Y., p. 73, t. 4, f. 77. 1843.

L. serrata, Haldeman.--Monog. of Limniades, Part 3, p. 10 1841.

Habitat.--Michigan, Wisconsin, &c., (Coll. Tryon.)

25. L. CATASCOPIUM, Say.

L. catascopium, Say.--Nicholson's Encycl., 1st edit., t. 2, f. 3. 1816.
Am. Conch., t. 55, f. 2. 1834.
Binney's Edit., p. 45 and 211, t. 70, f. 3, and t. 55, f. 2. 1858.
Potiez et Michaud, Galerie des Mollusques, p. 216, t. 22, f. 3, 4. 1838.
Haldeman, Monog. of Limniades, No. 3, p. 6, t. 1. 1841.
Gould, Invert. Mass., p. 223. 1841.
Lake Superior, p. 244. 1850.
De Kay, Moll. N. Y., p. 67, t. 5, f. 80. 1843.

L. cornea, Valenciennes.--Recueil d'Observ. Zool., &c., vol. ii., p. 251. 1833.

L. Virginiana, Lamarck.--Anim. sans Vert., Edit. 1, vol. vi., p. 160. Apr., 1822.
Deshayes, *Ibid.*, Edit. 2, vol. viii., p. 411. 1835.
Ibid., Edit. 3, vol. iii., p. 416. 1839.
Deshayes, Encyclopédie Méthodique, Vers. ii. p. 362. 1830.
Delessert, Recueil de Coquilles décrites par Lamarck, t. 30, f. 4. 1841.

L. sericata, Ziegler.--Rossmässler Iconog., vol. i., p. 98. 1837.

Habitat.--Massachusetts to Ohio, and southwards to Virginia.

26. L. PINGUIS, Say.

L. pinguis, Say.—Jour. Acad. Nat. Sci., vol. v., p. 123. 1825.
Binney's Edit., p. 114. 1858.

L. catascopium, Say, (Part.) Haldeman.—Monog. of Limniades, Part 3, p. 6, t. 1. 1841.
DeKay, Moll. N. Y., p. 67. 1843.

Habitat.—Delaware River, (Say.)

27. L. BROWNII, Tryon.

L. Brownii, Tryon.—Am. Jour. Conch., vol. i., part 3, p. 229, t. 23, f. 15. 1865.

Habitat.—Elyria, Ohio, (Tryon.)

28. L. GABBII, Tryon.

L. Gabbii, Tryon.—Am. Jour. Conch., vol. i., part 3, p. 229, t. 23. f. 2. 1865.

Habitat.—California.

29. L. TRASKII, Tryon.

L. Traskii, Tryon.—Proc. Acad. Nat. Sci., p. 149, t. 1, f. 13. 1863.
Contrib. to Conch., vol. iii., t. 1, f. 13. 1865.

Habitat.—Mountain Lake, Cal., (Tryon.)

30. L. ADELINÆ, Tryon.

L. Adelinæ, Tryon.—Proc. Acad. Nat. Sci., p. 148, t. 1, f. 12. 1863.
Contrib. to Conch., vol. iii., t. 1, f. 12. 1865.

Habitat.—San Francisco, Cal., (Tryon.)

31. L. PINGELII, Beck.

L. Pingelii, Beck.—Möller, Index, Moll. Grœnlandiæ, p. 5. 1842.

Habitat.—Greenland.

32. L. VAHLII, Beck.

L. Vahlii, Beck.—Möller, Index Moll. Grœnlandiæ, p. 4. 1842.

Habitat.—Greenland.

33. L. WORMSKIOLDI, Beck.

L. Wormskioldi, Beck.—Mörch, Moll. Grœn. in Rink's Greenland, p. 76. 1857.

Habitat.—Greenland.

34. L. HOLBÖLLII, Beck.

L. Holböllii, Beck.—Möller, Index, Moll. Grœnlandiæ, p. 5. 1842.

35. L. GRŒNLANDICA, Beck.

Habitat.—Greenland.

36. L. CAPERATA, Say.

L. caperata, Say.—New Harmony Disseminator, vol. ii., p. 230. 1829.
Binney's Edit., p. 148. 1858.
Adams, Moll. Middlebury, Vt. 1841.
Am. Jour. Sci., vol. xl., p. 268. 1841.
Shells of Vermont, p. 4. 1842.
Haldeman, Monog. of Limniades, Part 5, p. 34, t. 11, f. 1—9. 1842.
DeKay, Moll. N. Y., p. 69, t. 4, f. 66, 69. 1843.

L. umbilicata, Adams, Am. Jour. Sci., vol. xxxix., p. 374. 1840.
Boston Jour. Nat. Hist., vol. iii., p. 325, t. 3, f. 14. 1840.
Gould, Invert. Mass., p. 218, f. 149. 1841.

Habitat.— Vermont to Pennsylvania, and westwards to Illinois. San Francisco, Cal. S. E. Oregon, (Coll. Tryon.)

37. L. VITREA, Haldeman.

Limnæa vitrea, Haldeman.—Monog. of Limniades, Part 4, p. 3 of cover. 1842.
Ditto, Part 5, p. 47, t. 13, f. 14—15. 1842.
DeKay, Moll. N. Y., p. 75. 1843.

Habitat.—Ohio? Missouri? (Haldeman.)

38. L. PALLIDA, Adams.

L. pallida, Adams.—Am. Jour. Sci., vol. xxxix., p. 374. 1840.
Bost. Jour. Nat. Hist., vol. iii., p. 324, t. 3, f. 13. 1840.
Am. Jour. Sci., vol. xl., p. 268. 1841.
Moll. Middlebury, Vt. 1841.
Shells of Vermont, p. 3. 1842.
Haldeman, Monog. of Limniades, Part 5, p. 45, t. 13, f. 11—13.
DeKay, Moll. N. Y., p. 69, t. 4, f. 67. 1843.

Habitat.—Vermont, (Adams.)

39. L. ARCTICA, Lea.

L. Arctica, Lea.—Proc. Acad. Nat. Sci., p. 113. 1864.

Habitat.—Moose River, British America, (Lea.)

40. L. SMITHSONIANA, Lea.

L. Smithsoniana, Lea.—Proc. Acad. Nat. Sci., p. 113. 1864.

Habitat.—Loup Fork of Platte River, (Lea.)

41. L. LECONTII, Lea.

L. Lecontii, Lea.—Proc. Acad. Nat. Sci., p. 113. 1864.

Habitat.—Georgia, (Lea.)

42. L. JAMESII, Lea.

L. Jamesii, Lea.—Proc. Acad. Nat. Sci., p. 113. 1864.

Habitat.—Ohio. Georgia, (Lea.)

43. L. BULIMOIDES, Lea.

L. bulimoides, Lea.—Philos. Proc., vol. ii., p. 33. 1841. Am. Philos. Trans., vol. ix., p. 9. Observ., vol. iv., p. 9. 1844.
Haldeman, Monog. of Limniades, Part 5, p. 44, t. 13, f. 9, 10. 1842.
DeKay, Moll. N. Y., p. 75. 1843.

Habitat.—Oregon, (Lea.)

44. L. SOLIDA, Lea.

L. solida, Lea.— Philos. Trans., vol. vi., p. 94, t. 23, f. 91. Observ., vol. ii., p. 94. 1839.
Haldeman, Monog. of Limniades, Part 5, p. 36, t. 11, f. 10—13. 1842.
DeKay, Moll. N. Y., p. 75. 1843.

L. apicina, Lea.—Am. Philos. Trans., vol. vi., p. 102, t. 23, f. 109. Observ., vol. ii., p. 94, t. 25, f. 102. 1839.
Gould, Moll. Wilkes' Expl. Exped., p. 122. 1852.

Habitat.—Oregon, (Lea.)

45. L. HUMILIS, Say.

L. humilis, Say.—Jour. Acad. Nat. Sci., vol. ii., p. 378. 1822. Binney's Edit., p. 110. 1858.
Haldeman, Monog. of Limniades, Part 5, p. 41, t. 13, f. 1—8. 1842.
DeKay, Moll. N. Y., p. 71, t. 4, f. 71, a. b. 1843.

L. modicella, Say.—Jour. Acad. Nat. Sci., vol. v., p. 122. 1825.
Binney's Edit., p. 113. 1858.
Gould, Invert. Mass., p. 218, f. 151. 1841.

L. Linsleyi, DeKay.—P. 72, t. 4, f. 74, a. b. 1843.

L. Griffithiana, Lea.—Philos. Proc., vol. ii., p. 33. 1841. Philos. Trans., vol. ix., p. 8. Observ., vol. iv., p. 8. 1844.

L. exigua, Lea.—Philos. Proc., vol. ii., p. 33. 1841. Am. Philos. Trans., vol. ix., p. 9. Observ., vol. iv., p. 9. 1844.

L. planulata, Lea.—Philos. Proc., vol. ii., p. 33. 1841. Am. Philos. Trans., vol. ix., p. 9. Observ., vol. iv., p. 9. 1844.

L. rustica, Lea.—Philos. Proc., vol. ii., p. 33. 1841. Am. Philos. Trans., vol. ix., p. 10. Observ., vol. iv., p. 10. 1844.

L. plica, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 10. Observ., vol. iv., p. 10. 1844.

L. parva, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 11. Observ., vol. iv., p. 11. 1844.

L. curta, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 11. Observ., vol. iv., p. 11. 1844.

Habitat.—Maine to South Carolina, and westward to Wisconsin. Oakland, Cal., (Coll. Tryon.)

46. L. FERRUGINEA, Haldeman.

L. ferruginea, Haldeman, Monog. of Limniades, Part 3, p. 3 of cover. 1841.
Haldeman, Monog. of Limniades, Part 5, p. 49, t. 13, f. 19—20. 1842.
DeKay, Moll. N. Y., p. 75. 1843.

Habitat.—Oregon, (Hald.)

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47. LEPTOLIMNÆA ATTENUATA, Say.

L. attenuata, Say.—New Harmony Disseminator, vol. ii., p. 244. 1829.
Binney's Edit., p. 148. 1858.
Haldeman, Monog. of Limniades, p. 28, t. 9, f. 1, 5. 1842.
DeKay, Moll. N. Y., p. 75. 1843.

Habitat.—Mexico, (Say.)

48. L. KIRTLANDIANA, Lea.

L. Kirtlandiana, Lea.—Philos. Proc., vol. ii., p. 33. 1841.
Am. Philos. Trans., vol. ix., p. 12. Observ., iv., p. 12. 1844.

Habitat.—Ohio, (Lea.)

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49. ACELLA GRACILIS, Jay.

Limnæa gracilis, Jay.—Catalogue of Shells, 3d Edit., p. 112, t. 1, f. 10, 11. 1839.
Adams, Moll. Middlebury, Vt. 1841.
Am. Jour. Sci., vol. xl., p. 267. 1841.
Fresh Water and Land Shells of Vermont, p. 3. 1842.
Haldeman, Monog. of Limniades, Part 5, p. 50, t. 13, f. 21. 1842.
DeKay, Moll. N. Y., p. 70, t. 4, f. 73. 1843.

Habitat.—Vermont to Michigan.

50. A. LANCEATA, Gould.

Limnæa lanceata, Gould.—Proc. Bost. Soc. Nat. Hist., vol. iii., p. 64. 1848.
Lake Superior, p. 244, t. 7, f. 8,9. 1850.

Habitat.—Lake Superior, (Gld.)

DESCRIPTIONS OF NEW SPECIES OF EOCENE FOSSILS.*

BY R. P. WHITFIELD.

The following species of fossils (except *Columbella turricula* from Prof. J. Hall) were received, among others, from Mr. T. J. Hale, formerly of Madison, Wis., who collected them, several years since, at the localities mentioned under the descriptions. Finding them to be undescribed, and of interesting forms, I have thought them worthy of notice.

GENUS PISANIA, Bivon.

PISANIA CLAIBORNENSIS, nob.—t. 27, f. 2.

Description.—Spire short, broadly conical, consisting of about five very ventricose volutions; body whorl produced below, forming a short, somewhat twisted anterior canal; aperture large, obliquely oval, and forming, with the canal, rather more than one-half the length of the shell; posterior canal very small; outer lip thickened, and crenulate; entire surface marked by distinct revolving lines; faint longitudinal folds are visible on the three apical whorls, but are obsolete on the larger ones.

Dimensions.—Length ·75 inch, greatest transverse diameter ·52 inch.

Locality.—Claiborne, Alabama.

PYRULA, Lam.

PYRULA JUVENIS, nob.

Description.—Shell small and fragile; spire elevated; columella slender, slightly bent; aperture large, elongate, ovate or sub-elliptical; volutions three, marked on the periphery by three distinct carinæ or sub-angular revolving ridges, the upper one marked with closely-arranged, longitudinally elongate nodes, the others simple; entire surface marked by very fine revolving lines, which are somewhat fasciculate below the lower carina, there being three finer ones between each large one.

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* I believe Mr. Conrad regards the Vicksburg beds as not belonging to the Eocene proper, but calls them Oligocene.

Dimensions.—Length ·6 inch, transverse diameter a little less than ·3 inch.

Locality.—Six miles above Claiborne, Alabama, west side of river.

FULGUR, Montf.

FULGUR TRISERIALIS.

Description.—Shell thin, clavate or pyriform; spire short, consisting of four (or more) volutions, flattened above, and produced below into a long, slender canal; marked on the periphery or largest part of the volution by three rows of lanceolate nodes or subspines, the upper one being the most prominent; aperture large, elongate elliptical; canal straight; columella slender and smooth; entire surface marked by sharp revolving lines.

Locality.—Nine miles below Prairie Bluff, Alabama.

FUSUS, Lam.

FUSUS TORTILIS.—t. 27, f. 5.

Description.—Shell elongate-fusiform; spire slender, especially in the upper part, consisting of seven or eight sub-angular volutions, each marked by six strong longitudinal folds or varices, which are spirally arranged, those of one volution being a little behind the corresponding one of the preceding volution, the whole making about one-fourth of a turn in the length of the spire; canal long and straight, making, with the narrow ovate aperture, rather more than one-half of the entire length; surface marked by somewhat alternating revolving lines, strongest on the largest part of each volution.

Dimensions.—Length 1·75 inches, transverse diameter ·7 inch.

Locality.—Nine miles below Prairie Bluff, Alabama.

PSEUDOLIVA, Swainson.

PSEUDOLIVA ELLIPTICA.

Description.—Shell small, broadly elliptical; spire produced above, pointed; volutions four or five, rounded on the sides, the largest slightly inflated; suture close, bounded by a narrow band below; columella a little twisted, and flattened in the lower part; aperture wide, a little more than half the length of the shell, pointed above and deeply notched at the base; a very faint revolving groove at the top of the anterior third of the body volution, marking the place of the very small tooth-like projection on the outer lip; surface smooth, except a rather broad band near the base of the last volution formed by the siphonal notch.

Dimensions.—Length $\frac{3}{4}$ inch, transverse diameter $\frac{5}{8}$ inch.

Locality.—Vicksburg, Miss. Upper Eocene.

MONOPTIGMA, Lea.

MONOPTIGMA LEAI.—t. 27, f. 7.

Description.—Shell of medium size, with an elevated pointed spire; volutions about five, ventricose above, and attenuate below; suture distinct or slightly channelled; columella a little twisted in the lower part, with a strong, slightly oblique fold above the middle; aperture nearly three-fifths of the entire length of the shell, deeply notched at the anterior end; surface marked by a line of small nodes just below the suture, most distinct on the upper parts of the shell.

Dimensions.—Length of medium-sized specimen ·8 inch, transverse diameter of body volution ·35 inch.

This species differs from any species of the genus heretofore described, in the possession of the revolving line of nodes on the upper margins of the volutions.

Locality.—Vicksburg, Miss. Upper Eocene.

COLUMBELLA, Lam.

COLUMBELLA TURRICULA.—t. 27, f. 1.

Description.—Shell small, polished, sub-fusiform; spire much elevated; volutions six (seven?) slightly convex or flattened on the surface; suture grooved; aperture elongate-elliptical forming nearly one-third of the entire length of the shell; upper angle acute, strongly truncate at the base; outer lip thickened, with about seven proportionally strong dental projections; inner lip with about six smaller crenulations, corresponding to a similar number of oblique revolving ridges on the somewhat contracted columella; canal short and wide.

Dimensions.—Length ·20 inch, greatest transverse diameter ·07 inch.

Locality.—Claiborne, Alabama.

PLEUROTOMA, Lam.

PLEUROTOMA CAPAX.—t. 27, f. 3.

Description.—Shell small, broadly-fusiform; volutions five, strongly concave on the upper side, and ventricose below; ornamented on the periphery of the upper volutions with a line of nodes, which gradually decrease in size, and finally become obsolete on the body whorl; columella strong, slightly twisted in the lower part; aperture wide, and, with the canal, forming more than one-half the entire length of the shell; surface marked by very fine, tortuous, revolving lines, very faint on the concave part of the volutions; crossed by fine lines of growth, having a slight curve in the upper part.

Dimensions.—Length a little less than 1 inch, tranverse diameter ·45 inch.

Locality.—Six miles above Claiborne, Alabama.

PLEUROTOMA NASUTA.

Description.—Shell fusiform, much elongate and slender; spire consisting of five or six whorls; volutions concave above, subangular in the middle, and rounded below, marked on the middle by a row of longitudinally-elongate nodes; entire surface marked by fine, somewhat alternating, revolving lines, less distinct on the channel formed by the notch of the aperture; suture distinct, bounded below by an elevated band; aperture narrow, elongate, and, together with the long, straight canal, forming more than one-half the length of the shell.

Locality.—Six miles above Claiborne, Alabama, west side of the river.

PLEUROTOMA PERSA.—t. 27, f. 4.

Description.—Shell broadly-fusiform; volutions seven or eight, concave on the upper side, and rounded below, leaving a rounded ridge just above the suture line; columella elongate, very slender, and bent a little backwards near the lower extremity; aperture elliptical, not quite as long as the canal below, the two together forming about one-half the length of the shell; deeply notched in the upper part; surface marked with very fine, closely-arranged revolving lines, which are crossed by fine lines of growth, having a strong retral curvature on the upper part of the volution.

Dimensions.—Length of shell 1·12 inches, transverse diameter ·35 inch.

Locality.—Nine miles below Prairie Bluff, Alabama.

PLEUROTOMA ADEONA.

Description.—Shell fusiform; spire moderately high; volutions five, deeply concave on the upper side, carinate in the middle, and rounded below; ornamented on the carina by strong, oblique nodes, about fifteen on the body whorl; columella long, straight, and, with the aperture, forming more than half the length of the shell; entire surface marked by fine revolving striæ, and crossed by lines of growth having a deep retral curvature on the concave portion of the volution.

Locality.—Nine miles below Prairie Bluff, Alabama.

VOLUTA, Linnæus.

VOLUTA NEWCOMBIANA.—t. 27, f. 12.

Description.—Shell strong and robust; volutions six or more, moderately convex in the younger stages of growth, becoming more ventricose, and finally angular in the upper part of the body whorl; suture distinct; aperture about four times as long as wide, angular above, and deeply notched at the base, forming more than one-half the length of the shell; columellar folds four, very strong, the upper one transverse, the lower ones more oblique; outer lip thick and smooth; surface marked only by distinct lines of growth.

Dimensions.—Length 3½ inches, diameter 1⅝ inches.

Locality.—Six miles above Claiborne, Alabama.

MITRA, Lam.

MITRA HALEANUS.—t. 27, f. 6.

Description.—Shell broadly-fusiform; spire moderately high, broadly conical, pointed; body whorl ventricose, somewhat angular, and with a strongly concave space in the upper part; suture bordered below by an elevated nodose ridge; columella produced below, marked near its middle by three somewhat oblique equidistant folds; surface marked by numerous small, longitudinal folds, which form nodes on the angular part of the volutions, and become obsolete just below their middle; the entire surface is marked by slightly alternating revolving grooves, which cut the folds, and give to the upper part of the volution a strongly cancellated or rasp-like appearance; most specimens have an intermediate revolving line in the concave part of the volution.

Locality.—Vicksburg, Miss.

MITRA BICONICA.

Description.—Shell slender, fusiform; spire elevated; volutions six or seven, slightly convex, with a narrow depression just below the upper margin; suture well marked; body whorl somewhat gradually tapering below its most convex portion; aperture long and narrow; columella strong, with two distinct, very oblique folds a little above the middle of its length; surface of the volutions marked by strong longitudinal folds, about nine on the body whorl; entire surface covered with very fine revolving striæ.

Dimensions.—Length of specimen ¾ inch.

Locality.—Six miles below Prairie Bluff, Alabama.

NATICA, Lamarck.

NATICA ERECTA.—t. 27, f. 11.

Description.—Shell subglobose; spire elevated; volutions five, ventricose; suture well marked; substance of the shell thin; aperture large, obliquely ovate; outer lip thin and sharp; columellar lip slightly thickened and grooved, without callus; umbilicus small, partly concealed by an extension of the columellar lip; surface of the shell polished.

Localities.—Six miles above Claiborne, on the west side of the river; and ten miles below Prairie Bluff, Alabama.

NATICA PERSPECTA.

Description.—Shell oblique, of medium size; substance thick; volutions four in the largest individuals, very ventricose; spire low; suture very distinctly channelled; umbilicus proportionally large, entirely destitute of a callus, the volutions being distinctly visible to the apical one; aperture semilunate, the inner lip spreading somewhat on the preceding volution, opposite the umbilicus it is thin and emarginate; outer lip sharp; surface polished.

This beautiful little shell differs from any described species, in the deep channelling of the suture and the characters of the umbilicus.

Locality.—Nine miles below Prairie Bluff, Alabama.

NATICA REVERSA.

Description.—Shell small, globose; spire moderately elevated; volutions ventricose; suture deep; aperture semicircular, and moderately large, equaling two-thirds the length of the shell; outer lip sharp; inner lip slightly thickened, spreading over the preceding volution; callus represented by a thickened spiral ridge, deposited on the left side of the umbilicus, and uniting with the peristome at the inner basal angle; substance of the shell thick; surface polished.

Dimensions.—Height ·3 inch.

Locality.—Nine miles below Prairie Bluff, Alabama.

NATICA (*Polinices*) ONUSTA.

Description.—Shell obliquely elliptical; spire low, a very small portion only of the inner volutions showing; volutions flattened in the upper part, and abruptly rounded below; suture slightly channelled; aperture very large, obliquely semilunate; callus very large, entirely filling the umbilical portion of the shell; surface smooth, or marked only by fine lines of growth.

Locality.—Six miles below Prairie Bluff, Alabama.

NATICA (*Girodes*) ALABAMIENSIS.—t. 27, f. 9, 10.

[illegible]

Description.—Shell oblique subspatulose; spire elevated; volutions four, flattened on top; aperture large, broadly subovate; columella flattened, and slightly grooved; umbilicus minute, or none; surface marked by fine, wavy revolving lines, strongest near the upper part of the volution, crossed by distinct lines of growth.

Dimensions.—Length ·80 inch, width ·62 inch.

Locality.—Six miles above Claiborne, Alabama, west side of the river.

NATICA (*Girodes*) APERTA.

Description.—Shell very oblique, patulose; spire low; volutions three, slightly flattened on the top, with a depression just below, and sharply rounded on the lower part; umbilicus very large; upper part of the columellar lip reflected over the umbilicus; callus none; aperture large, semi-lunate; surface marked by lines of growth.

Locality.—Six miles above Claiborne, Alabama.

VELUTINA, Fleming.

Type of Leptonoti

VELUTINA (*Otina*) EXPANSA.—t. 27, f. 14, 15.

Description.—Shell minute, broadly expanded; spire very low; volutions from two to three, the outer one forming the greater part of the shell; peristome continuing around the body of the volution to near the base of the columella; margin of the aperture flattened or slightly reflected: inner surface of shell highly polished; exterior marked by irregular lines of growth.

The different individuals differ somewhat in the degree of expansion of the outer volution.

Dimensions.—The largest individual seen, measures ·05 inch across the aperture.

Locality.—Six miles below Prairie Bluff, Alabama, in sand, filling the cavities of other shells.

CERITHIUM, Adanson.

CERITHIUM VINCTUM.—t. 27, f. 8.

Description.—Shell regularly elongate, conical; volutions ten or more; flattened above, ventricose below, and becoming gibbous or irregularly contracted in the last volution of adult specimens, and ornamented by a revolving band, which occupies the lower half of the exposed part; upper part of the shell marked by small, closely-arranged longitudinal folds, which, in the larger volutions do not extend to the band, leaving it smooth, with the upper margin elevated; aperture oblique; columella sub-spiral; anterior canal slightly reflected.

Dimensions.—Length 1·45 inches, diameter of body whorl ·5 inch.

Locality.—Vicksburg, Miss. Upper Eocene.

POTAMIDES, Brongniart.

POTAMIDES ALABAMIENSIS.—t. 27, f. 13.

Description.—Shell turrited, consisting of about eight short, strong, rounded volutions; columella short; aperture obliquely ovate, lower basal portion auger-shaped; entire surface marked by strong, sharply elevated revolving lines, strongest on the middle of the volution; eleven can be counted on the body whorl; the revolving lines are crossed by faint lines of growth, which have a slight sigmoidal curve.

Dimensions.—Length of shell 1·12 inches, transverse diameter of body whorl ·45 inch.

Locality.—Six miles below Prairie Bluff, Alabama.

TURRITELLA EURYNOME.

Description.—Shell elongate, very gradually tapering; volutions flattened; surface marked by four strong, well-defined revolving ridges, with sometimes an intermediate finer one on the middle of the volution; the four ridges are arranged in pairs, with flattened spaces between, the central space wider than the others; the upper carina marks the upper margin of the volution, while the lower one is as far from the lower margin as the breadth of the space between the upper pair; under side of volution marked by four or more less distinct ridges; volutions crossed by distinct lines of growth, having a strong retral curvature, embracing the entire surface; aperture elongate-ovate.

Locality.—Six miles above Claiborne, Alabama, on the west side of the river. Lisbo

TURRITELLA MULTILIRA.

Description.—Shell of moderate size, extremely elongate, slender; volutions numerous (number unknown), quadrangular, flattened on the surface; upper margin elevated above the preceding volution; aperture rounded; surface marked by numerous very fine but distinct revolving striæ, crossed by finer lines of growth, having a deep retral curve.

This species bears some resemblance to *T. quadristriata*, Rodgers, except in the surface markings.

Locality.—Six miles below Prairie Bluff, Alabama.

TURRITELLA ALABAMIENSIS.

Description.—Shell slender; volutions twelve or more; sub-quadrangular, lower margin sometimes projecting; suture distinctly marked; aperture sub-elliptical, slightly oblique; surface marked by numerous fine revolving lines, which are scarcely alternate, and crossed by distinct lines of growth, which make a deep sinus on the body of the volution, and are again bent backwards on the lower angle.

This species scarcely differs from *T. cælata,* Conrad, from the Vicksburg (Miss.) beds, except that it is destitute of the lines of granulas which give so decided a character to that species.

Locality.—Nine miles below Prairie Bluff, Alabama.

CUCULLÆA, Lamarck.

CUCULLÆA MACRODONTA.—t. 27, f. 17.

Description.— Shell of medium size, sub-rhomboidal in outline, broad heart-shaped in profile; hinge line nearly as long as the greatest length of the shell; hinge area broad, corrugated; valves deep; beaks distant, slightly incurved; surface marked by from forty-five to fifty low, radiating ribs, which are finely corrugated by concentric lines; ribs indistinct on the posterior part; a rather deep, narrow sulcus extends from the beak to the posterior basal angle, leaving a prominent umbonal ridge; hinge line with sixteen teeth, the right valve having four at each extremity, parallel to it; muscular scars sub-quadrangular, the posterior much the largest; muscular ridges faint or obsolete; pallial line crenulate; inner margin of shell smooth.

This species is remarkable for the very transverse lateral teeth, a feature not often noticed in fossil species of the genus.

Locality.—Nine miles below Prairie Bluff, Alabama.

CRASSATELLA, Lamarck.

CRASSATELLA TUMIDULA.—t. 27, f. 16.

Description.—Shell sub-triangular or sub-clavate in outline; anterior end broadly rounded; posterior end narrow, acute; valves ventricose in front, attenuate behind, with a shallow sulcus in front of the umbonal slope; surface smooth, except rugose markings on the umbones; hinge teeth moderately large; lateral tooth elongate, linear; ligamental area shallow, broad-triangular; muscular scars large; anterior subreniform; posterior circular; margin of shell finely crenulate on the anterior and antero-basal portions.

Closely resembles *C. pteropsis,* Gabb, a Cretaceous species.

Locality.—Six miles above Claiborne, Alabama, west side of the river.

EXPLANATION OF PLATE 27.

Fig. 1. COLUMBELLA TURRICULA, Whitfield. (Enlarged.)—P. 261.
" 2. PISANIA CLAIBORNENSIS, Whitfield.—P. 259.
" 3. PLEUROTOMA CAPAX, Whitfield.—P. 261.
" 4. " PERSA, Whitfield.—P. 262.
" 5. FUSUS TORTILIS, Whitfield.—P. 260.
" 6. MITRA HALEANUS, Whitfield.—P. 263.
" 7. MONOPTIGMA LEAI, Whitfield.—P. 261.
" 8. CERITHIUM VINCTUM, Whitfield. The specimen figured is not an adult shell, and does not show the contraction of the last volution.—P. 265.
"9 & 10. NATICA (*Girodes*) ALABAMIENSIS, Whitfield.—P. 265.
" 11. " ERECTA, Whitfield.—P. 264.
" 12. VOLUTA NEWCOMBIANA, Whitfield.—P. 263.
" 13. POTAMIDES ALABAMIENSIS, Whitfield.—P. 266.
"14 & 15. VELUTINA (*Otina*) EXPANSA, Whitfield. (Greatly enlarged.)—P. 265.
" 16. CRASSATELLA TUMIDULA, Whitfield.—P. 267.
" 17. CUCULLÆA MACRODONTA, Whitfield.—P. 267.

Editor's Table.

REVIEWS.

I.—AMERICAN.

Bibliography of North American Conchology, previous to the year 1860. Prepared for the Smithsonian Institution: BY W. G. BINNEY.

Part 1. *American Authors.* 650 pp., 8vo. 1863.
Part 2. *Foreign Authors.* 300 pp., 8vo. 1864.

We should have noticed this important work at an earlier date. Mr. Binney has devoted a number of years to the accomplishment of his task, and it has resulted in a Bibliography of our Conchology, so complete as regards American authors, that probably not a single publication, however obscure or insignificant, has been omitted. The 2d Part, embracing Foreign Authors on American Conchology, is not so complete, many minor papers being unnoticed. Mr. Binney, however, probably has not intended this Part to be so exhaustive as the former one.

The plan of the work has been, to quote Author's name in heavy-faced type, followed by the full title of the work or paper quoted from, together with the printed date of publication. Then follows a complete list of genera and species, their synonymy as given by the author cited, localities, and references to page, plate and figure. At the end of each Part is an Index of Authors and Titles of Works. Part 3d (in preparation) will consist of a General Index of Species, and will complete the entire work.

The amount of labor entailed by the preparation of a work of this nature is immense, and can only be properly appreciated by those who have engaged in similar undertakings. It is all the more creditable to the author, because the same amount of work in another direction would have produced more showy results in the description of new species.

While bestowing this deserved praise upon Mr. Binney's undertaking,—a work that will be consulted by conchologists more than any other ever published in America,—we feel that we would be doing an injustice to him and to the liberal Institution, at whose expense it is published, if we omitted to point out what appears to us to be a few errors in the plan of the work.

The *Date of Reading* of the various papers has been omitted. This is a small matter; but its insertion could do no harm, as naturalists are not *all* agreed in regard to what constitutes *publication*. A book of this nature should afford every possible information to those who have occasion to consult it, whether they adhere to the Rules of the British Association or to those of the French Academy.

We think, that, in many cases, a more accurate date of publication should be given, than that affixed on the title-page of the entire volume in which the paper is contained.

We refer more particularly to the American Journal of Science, and to the Transactions of the American Philosophical Society. The volumes of both these publications are issued in Parts, and the date of the general title-page is, therefore, inaccurate as regards the publication of a portion of the pages following.

We are not aware that this omission, in the case of Silliman's Journal, will affect the synonymy of any of our species, but it is attended with rather grave consequences in that of the American Philosophical Transactions. The Parts comprised in the earlier volumes of this publication were issued separately at long intervals, *without date.* It curiously happened that two American authors, working at the same time in the same particular direction, in a number of cases described the same species, each being ignorant of the labors of the other till after their respective publication. Subsequently, Mr. Conrad, in his admirable "Synopsis of Naiades," claimed precedence for his own specific names, naturally taking the date of title-page of the volume of the American Philosophical Transactions as the date of publication of Mr. Lea's descriptions. Mr. Lea,* however, immediately proved the time of publication of some of these Parts of the volumes of Transactions, and, consequently, the prior date of certain of his species by evidence which has never been questioned. Yet Mr. Binney has not deemed it advisable even to mention the dates stated by Mr. Lea, except in regard to four species only, and thus those who in future times depend, as they certainly will on the Bibliography, for the synonymy of these species, will be misled into the perpetuation of a wrong.

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* Proc. Acad. Nat. Sciences, Philada., vol. vii., p. 236. 1854.

We do not agree with Mr. Binney, that typographical errors in the originals should not be corrected, because, in *some cases*, their correction is difficult or impossible, any more than we would agree that things should *all* go wrong unless we could make them *all* go right. We think he ought to have corrected as many of these errors as possible.

Considering the immense material of these two volumes, we are surprised at the great accuracy of the print. Save in the case above pointed out, the typographical errors are singularly few, showing the most careful, painstaking proof-reading: as Mr. Binney states in his preface: "The proof has generally been corrected from the original work, thus avoiding many errors committed in transcribing." Naturalists may obtain this book, free of cost, upon application to the Smithsonian Institution, which has so generously undertaken its publication, as one of its series of works on the Natural History of our country.

Proceedings of the Academy of Natural Sciences of Philadelphia. No. 1.—January, February and March, 1865. (Published in April.)

Synonymy of the Species of Strepomatidæ, a family of Fluviatile Mollusca inhabiting North America. Part 4: BY GEORGE W. TRYON, JR.

The former papers on this subject were published in the Proceedings of the Academy for 1863—64. The present paper completes the series, and contains a revision and correction of the former three, together with an entire group of 57 species previously omitted. A synopsis of the new genus *Eurycælon*, proposed by Mr. Lea in 1864, is included; it comprises eight species, formerly considered *Goniobases* and *Anculosæ.*

Among the corrections of synonymy are the following, worthy of particular attention:—

No. 28. *P. unciale*, Hald.; *P. bicostatum*, and *rigidum*, Anth., *P. sugillatum*, Reeve, and *P. oblita*, Lea, are all synonyms.

No. 83. *P. opaca*, Anth.; *P. iostoma* and *nigrostoma*, Anth., and *P. Tennesséense*, Lea, are synonyms. Mr. Anthony's species were formerly considered *Goniobases.*

No. 22 a. *G. abbreviata*, Anthony. In the synonymy of this species must be included Mr. Anthony's *G. elegantula*, *coronilla* and *chalybæa.*

No. 28 a. *G. strenua,* Lea; *G. Leidyana,* and *carinocostata* are the same.

No. 31. *G. obtusa,* Lea; *G. substricta,* Hald., and *cadus,* Lea, are synonyms.

No. 37. *G. interrupta,* Hald., *G. Christyi,* Lea, *G. instabilis,* Lea, and *G. ornatella,* Lea, form but one species.

No. 127. *G. acutocarinata,* Lea, *pagodiformis* and *torulosa,* Anth., are the same.

No. 157. *G. simplex,* Say; *G. subsolida, Vanuxemii* and *Warderiana* of Lea are synonyms.

No. 186 a. *G. sordida,* Lea; *G. plebeia* and *brunnea,* Anth., are synonyms.

No. 191. *G. adusta,* Anth.; *G. Cumberlandiensis,* Lea, and *G. funebralis,* Anth., are synonyms.

Instead of the name of *Anculosa dissimilis,* Say, that of *carinata,* Brug., is adopted. The latter was proposed in the "Encyclop. Methodique, Vers." i., p. 301, 1792, twenty-seven years prior to Say's description. This shell was first figured by Lister.

American Journal of Science and Arts. No. 117. May, 1865.

Remarks on the Beatriceæ, a new Division of Mollusca: BY ALPHEUS HYATT, JR.

We condense the material portions of this paper, and regret that our space will not allow its re-publication entire:—

"The *Beatriceæ* are long, cone-like bodies, composed of three distinct parts, or layers, in the following order: (1) A central chain of small hollow chambers; (2) a succession of concentric coniform layers; (3) an external or sub-epidermal layer."

[These Silurian fossil shells were at first supposed to be plants, and the first species was so described by Mr. Billings.]

"The *Beatriceæ* are very like the *Hippuritidæ,* both in general form and the arrangement of the component parts of the shell; but here again it may be demonstrated that the resemblance is not so close as it at first appears to be.

"The geological horizon in which they occur, without other evidence, would alone be sufficient to render their affinity with the *Hippuritidæ* exceedingly doubtful; but, besides this, the structure, evidently, is not so closely allied to that of the Hippurite as to the Cephalopod. The shell of the Hippurite is composed of three parts: first, the inner septa, second, the outer layers, which frequently form a porous mass, and third, an external sub-epidermal layer.

"The inner septa, which supported the principal part of the body of the Mollusk, form large cavities, while the second part is made up of laminæ laid on by the mantle margin, or at least that part corresponding to the mantle margin of the Lamellibranchiates.

"In *Beatriceæ,* on the contrary, the inner septa did not contain the body of the animal, and there are no marks whatever of a mantle margin. This objection could not be urged against their affinity with *Caprinella* and the like, in which the central cavities are small; but from these they may be separated by the absence of all ligamental or muscular impressions and the mode of forming annular, cellular partitions, composed of numerous laminæ, instead of a continuous series of porous or tubular laminæ.

"The *Hippurites, Caprina,* and the like, were, with few exceptions, attached to the surfaces upon which they lived or to each other, and had short, thick, cone-like forms, affording broad bases of attachment, whereas the *Beatriceæ* were long, thin, almost tubular bodies, resembling the *Orthoceratites,* and entirely unfitted to support themselves in fixed positions.

"We saw hundreds of *B. nodulosa* and *B. undulata* 'in situ,' but nowhere any indications of attachment, either to the rocks or to each other.

"After close comparison with all the types to which these singular fossils appeared to have any resemblance, I have at length considered myself warranted in considering them as Cephalopods more closely allied to the genus *Endoceras*, than to any other group of that class.

"They differ greatly from all the Tetrabranchiates, in the open structure of the partitions or septa between the chambers, and this character, together with the absence of a siphon, and the cone-like form of the septa, demands that they should be separated as a distinct order, for which I propose the name of Ceriolites. Although distinct as an order because of the differences in the form and structure of the septa, arising from their great length, and the loose way in which the laminæ are arranged, the parts may be compared point for point with similar parts of *Endoceras.*

"We may imagine the cone-like septa of a Beatricean to be spread apart, until their surfaces should be parallel throughout the shell; they would then be entirely separated by hollow chambers, as the septa are in *Endoceras,* and if, at the same time, the central cup-like cavities were supposed to be prolonged into cones, we should, without violence to the typical idea of the organization, have transformed the *Beatricea* into a shell separable from the *Endoceras* by only one character, the vesicularity of the septa.

"The analogies which the *Beatriceæ* have with plants in their general aspect, with Radiates in their internal vesicular structure, and with *Hippurites* in the arrangement of the parts, are so close as to entirely bury, as it were, their true affinity with Cephalopoda, which only becomes obvious after diligent comparisons."

"There still remains a question which I have not been able to solve in a satisfactory manner with the specimens at my command. Are the *Beatriceæ* internal or external shells? This problem, so difficult to settle conclusively with regard to the *Orthoceratites*, is equally puzzling in the structure of *Beatriceæ*. Their extreme length, cellular structure, and the irregularity of the ornamentation, would be almost determinative in favor of their being internal shells, were it not for the aspect of the cast of the animal in the terminal chamber of the specimen from English Head, which proves that a large portion, if not the whole of the body, was contained within the shell."

"There are but two known species of the order Ceriolites, both occurring in the Silurian strata of Anticosti."

"ORDER CERIOLITES, Hyatt.

FAMILY CERIOLIDÆ, Hyatt.

Genus BEATRICEA, Billings.

"*Beatricea nodulosa*, Billings, is a long cone, tapering very gradually, the central chambers occupying from a fourth to a third of the transverse diameter in adults; in the young they are larger proportionally, varying from one-half to two-thirds of the breadth of the whole shell. The coniform layers are nearly parallel; the inclination at the lower part, as they trend outward to the circumference, being decreased very slowly. The external shell is closely set with tubercles, and covered with granular points. The size, as nearly as could be inferred from fragments, is not over four feet long, by from three to five inches in diameter at the larger end.

"*B. undulata* is a much larger species, one fragment found by the expedition being thirteen and a half feet long, by eight and a half inches in diameter at the larger end, and judging by the inclination of the sides, the length of the entire shell, when living, was certainly not less than twenty feet. The chambers are very small, frequently in adults not occupying more than one-tenth of the transverse diameter. The coniform layers are more widely separated in the adults than in the young; their inclination as they trend outward to the periphery is more decided, and they nowhere assume the parallel appearance of the same parts in *Beatricea nodulosa*.

"The exterior is granulated and ornamented by ten or more prominent longitudinal ridges and intervening broad, shallow channels."

Synonymy of the Species of Strepomatidæ (Melanians) of the United States; with Critical Observations on their Affinities, and Descriptions of Land, Fresh Water and Marine Mollusca: BY GEORGE W. TRYON, JR. 8vo., cloth, 100 pp., and 2 lithographic plates. New York: Bailliere Brothers, 520 Broadway. 1865. Price $2.00.

This little volume contains:—

Contributions towards a Monography of the Order Pholadacea, with Descriptions of new Species.

Descriptions of two new Species of Fresh Water Mollusca from Panama.

Description of a new Exotic Melania.

Descriptions of new Species of Fresh Water Mollusca, belonging to the families Amnicolidæ, Valvatidæ and Limnæidæ; inhabiting California.

Description of a new Species of Pleurocera.

Description of a new Species of Teredo, from New Bedford, Mass.

Descriptions of two new Species of Mexican Land Shells.

Synonymy of the Species of Strepomatidæ, Parts 1, 2, 3, 4, *and Supplement.*

These papers were all first published in the Proceedings of the Academy of Natural Sciences for 1863—5, and two or three of the latter ones have been already noticed by us. The Supplement to the papers on Strepomatidæ contains a synonymic list of the species published by Mr. Lea in 1864, so that *all* the species inhabiting the United States are now included. The interest of this part of the work is much enhanced by a very full index of the species and synonyms, containing nearly 900 names.

The earlier papers of this volume contain the following descriptions of new species:—

Zirphæa Gabbii,	Coast of Japan.
Xylotrya setacea,	Bay of San Francisco.
Planorbis Fieldii,	Panama.
Amnicola Panamensis,	"
Melania Helenæ,	Philippine Islands.
Amnicola Rowellii,	California.
Pomatiopsis Binneyi,	"
Valvata virens,	"
Limnæa Adelinæ,	"
" *Traskii,*	"
Physa Gabbii,	"
Ancylus fragilis,	"
Pleurocera plicatum,	Nashville, Tenn.
Teredo Thomsonii,	New Bedford, Mass.
Helix Rémondi,	Mazatlan, Mexico.
Cyclotus Cooperi,	" "

In the portion of the work relating to Strepomatidæ, over 3500 references to publications are made, which will indicate the amount of labor required in this, the *easiest* branch of the subject; for the principal labor consisted in the critical examination and comparison of specimens, very few decisions being based on the published descriptions. The following is a portion of the Preface to the 1st Part of the Synonymy (published in 1863):—

"The following synonymy of the very numerous species of North American shells, heretofore considered Melanians, is offered as the result of a year's study of the extensive collections of the Smithsonian Institution and of the Academy of Natural Sciences, as well as those of Messrs. Lea, Haldeman, Anthony and Gould, together with my own and several smaller collections."

It is not necessary to advert here to our views of the synonymy of the family or of its genera, as we have already fully treated of this subject, in the 2d No. of the Journal of Conchology.

II.—FOREIGN.

BRITISH.

Conchologica Iconica: BY LOVELL REEVE.

Parts 244, 245, (1865,) contain:—

Marginella, Plates 14—27, and species 58—159, completing the genus.

The new species herein described are:—

M. DeBurghiæ,	Adams, MS.,	Swan River.
" *ovum,*	Reeve,	(?)
" *Hondurasensis,*	Reeve,	Honduras.
" *vexillum,*	Redfield,	Cape Palmas.
" *bibalteata,*	Reeve,	West Indies.
" *livida,*	"	(?)
" *guttula,*	"	(?)
" *tribalteata,*	"	(?)
" *navicella,*	"	(?)
" *effulgens,*	"	Island of St. Thomas.
" *alabaster,*	"	(?)
" *immersa,*	"	(?)
" *cantharus,*	"	(?)
" *rufescens,*	"	(?)
" *Capensis,*	Dunker, MS.,	Cape of Good Hope.

M. Traillii, Reeve,	Malacca.
" *simplex*, "	Australia.
" *attenuata*, "	New South Wales.
" *pyrulum*, "	Island of St. Thomas.
" *electrum* "	(?)
" *annulata*, "	(?)
" *dens*, "	Borneo.
" *serrata*, Gaskoin, MS.,	West Indies.
" *triplicata*, "	Philippines.
" *compressa*, Reeve,	(?)
" *Volutiformis*, "	(?)
" *obscura*, "	(?)
" *paxillus*, "	(?)
" *affinis*, "	Island of St. Thomas.
" *bullula*, "	Borneo.
" *olivella*, "	Australia.
" *corusca*, "	Singapore.
" *bulbosa*, "	Borneo.
" *semen*, "	(?)
" *Jewettii*, Carpenter, MS.,	St. Barbara, Cal.
" *ros*, Reeve,	(?)
" *encaustica*, Reeve,	Ceylon.
" *rufula*, Gaskoin, MS.,	Cape of Good Hope.
" *infans*, Reeve,	Singapore.
" *epigrus*, "	Mogadore, Morocco.
" *pisum*, "	Australia.
" *Bensoni*, "	Cape of Good Hope.
" *lachryma*, "	Borneo.

The observations on the geographical distribution of the genus are very interesting.

Unio. Plates 19—20.

FRENCH.

Melacologie de l'Algerie: BY J. R. BOURGUIGNAT.

5th Part, April, 1864. Pp. 145—232, and plates 6—26, contains:—

PLANORBIS, 17 species, of which the following are new:—

Pl. êuchelius, *Pl. agraulus*, *Pl. Numidicus*,
Pl. euphæus, *Pl. diaphanellus*, *Pl. Raymondi.*

PHYSA, 7 species. LIMNÆA, 5 species. ANCYLUS, 11 species. BRONDELIA, 2 species. CYCLOSTOMA, 3 species. ACME, (with a synonymy of the European species,) 2, which are new:—

A. Lallemanti, *A. Letourneuxi.*

BITHINIA, 2 species. HYDROBIA, 5 species.

Journal de Conchyliologie, Vol. XIII., No. 1. January, 1865. 96 pp., 4 plates.

Note sur les mœurs du Murex erinaceus: BY P. FISCHER.

Note sur le genre Entoconcha, de Muller: BY P. FISCHER.

Note sur le genre Cryptobia de Deshayes: BY O. A. L. MÖRCH.

Observation relative au byssus du Dreissena polymorpha: BY O. A. L. MÖRCH.

Note sur le genre Monocondylœa de d'Orbigny, et description d'une espèce nouvelle: RY S. PETIT DE LA SAUSSAYE.

Monocondylœa Cambodjensis. Cambodia.

This species appears to resemble very closely *M. crebristriata*, Anth., herein described, but M. Petit does not mention the numerous small plicæ which are so very characteristic of Mr. Anthony's species.

Rectifications et additions à le faune Malacologique de l'Indo-Chine: BY A. MORELET.

The author, premising that he agrees entirely with Rossmässler, that the rectification of a bad description is more useful to science than the description of a new species, proceeds to state that *Unio abnormis*, Morlt., Rev. Zool., 1862, is the same as *U. gravidus*, Lea, 1856; *U. imperialis*, Morlt., l. c., is a synonym of *U. Hainesianus*, Lea; and that *U. mandarinus*, Morlt., Jour. Conch. 1864, is a synonym of *U. scobinatus*, Lea.

M. Morelet, with the greatest candor, acknowledges that the publication of Mr. Lea's papers in the "Proceedings of the Academy of Natural Sciences of Philadelphia," also afterwards in the "Journal" of that Society, and in his "Observations on the Genus Unio," besides the numerous extracts and notices of the paper in the various periodicals, leaves him no excuse for his ignorance of these species.

The following new species are described:—

U. misellus, Siam. *U. pellis-lacerti*, Siam.

The author mentions that the same locality has afforded to him a number of other species, apparently new; but he hesitates to describe them for the present. The two above described are believed to be very distinct from any others.

Note additionelle sur le Tenagodus Bernardii, Mörch: BY H. CROSSE.

Description d'une nouvelle espèce de Volute de l'Australie: BY G. B. SOWERBY.

Voluta Ellioti.

Description d'espèces nouvelles de la Guadeloupe: BY H. CROSSE.

Terebratulina Cailleti.
Murex abyssicola.
Fusus Schrammi.
Pleurotoma Jelskii.
" *Antillarum.*
Astralium Guadeloupense.

Description d'espèces nouvelles d'Australie méridionale: BY H. CROSSE and P. FISCHER.

Bullæa Angasi.
Bulla eumicra.
Fissurella concatenata.
" *omicron.*
Patella calamus.
Scalaria delicatula.
" *consors.*
Ringicula Australis.
Turritella spina.
Cerithium monachus.
Triphorus Angasi.
" *Pfeifferi.*
Buccinum filiceum.
Ricinula Adelaidensis.
Purpura humilis.
Fusus Lincolnensis.
Typhis Yatesii.
Columbella Yorkensis.

Diagnoses Molluscorum novorum: BY H. CROSSE.

Collonia Frickii,	California.
" *Eucharis,*	(?)
Murex Frickii,	California.
Cypræa Thomasi,	(?)

Description d'un Pedicularia fossile: BY M. J. SEQUENZA.

Pedicularia Deshayesiana.

Note sur une espèce nouvelle du genre Pernostrea: BY P. FISCHER.

Pernostrea Eudesi, Fischer.

Production artificielle des Perles: BY P. FISCHER.

Acclimatation, en France, de Mollusques exotics: BY P. FISCHER.

The shells alluded to are *Mercenaria violacea* and *Ostrea Virginica*, colonies of which, sent a few years ago, are quite flourishing and increasing in size, but none of the young have been observed, and it is doubtful whether any reproduction has taken place.

Un préservatif contre les ravages des Tarets: BY H. CROSSE.

Intervention des Mollusques et des Cirrhipèdes dans le conflit Américain: BY H. CROSSE.

"Les derniers journaux américains nous ont révélé un fait scientifique assez curieux et qui touche suffisamment à l'histoire naturelle pour que nous croyions devour le relever ici. On sait que les principales passes de la baie de Mobile avaient été garnies, par les confédérés, de nombreux engins destructifs, connus sous le nom de torpilles (*torpedo*), et disposés de manière à éclater sous les navires qui viendraient à les heurter en passant. Au bout de quelque temps, l'enveloppe métallique de ces redoubtables machines a été tellement recouverte et encroûtée par divers Mollusques adhérents et par des Balanes, que le jeu du marteau extérieur, dont le choc déterminait l'explosion, est devenu impossible, dans la plupart des cas. Cette intervention imprévue a grandement facilité les opérations de l'amiral qui commandait les forces du Nord dans ces parages, et lui a peut-être épargné un désastre. Les Mollusques, eux aussi, viennent donc de donner leur avis dans le conflit américain: ils sont opposés à la guerre. Si les membres du congrès de la paix n'étaient pas si occupés à se quereller entre eux, ils auraient là une bien belle occasion de décerner des diplômes d'honneur."

Essai d'acclamatation, en France de l'Helix Yucatanea, Morelet: BY H. CROSSE.

Bibliographie.

No. 2. April, 1865.

This number contains 144 pages, and 2 colored plates.

Recherches sur la faune Malacologique de la baie de Suez: BY DR. LÉON VAILLANT.

The author spent several months at Suez, and dredged many of the species enumerated by him. He prefaces his List by a description of the physical features of the neighboring coasts and sea-bottoms.

Thirty-one univalve and forty-nine bivalve Mollusks are enumerated. Of course, many of these are common to the Indian Ocean.

Strombus tricornis and *Murex anguliferus*, says M. Vaillant, are eaten by the Greeks and Arabs, working in the construction of the canal.

The following new species are described:—

Mytilus (Modiolarca) cœnobita.
Lithodomus Lessepsianus.
Diplodonta Savignyi.
Syndosmya strigilloides.
Cumingia Deshayesiana.

Note sur la présence, en Algérie, du Ropan d'Adanson: BY P. FISCHER.

This shell, the *Modiola caudigera* of Lamarck, was first discovered at the Island of Gorée and Cape Verd by Adanson; it has not been noticed at Madeira, the Canaries, or Azores, but is found on the Atlantic coast of Spain, Portugal, and at Guétary, France. It has not been discovered in any other part of the Mediterranean except the coast of Algiers.

Diagnoses de Mollusques nouveaux provenant de Californie et faisant partie du Musée de l'Institution Smithsonienne:
BY PHILIP P. CARPENTER.

Angulus Gouldii.
Oedalia subdiaphana.
Psephis tellymyalis.
Tapes laciniata.
Kellia (Laperousii, var.*) Chironii.*
“ *rotundata.*
Ostrea lurida.
Tornatella punctocælata.
Cylichna planata.
Lottia gigantia, Gray.
*Bittium (*var. *?) escuriens.*
“ *attenuatum.*
? “ *quadrifilatum.*
Barleeia subtenuis.
“ *(? subtenuis,* var.*) rimata.*
“ *haliophila.*
Drillia torosa.
“ *(? torosa,* var.*) aurantia.*
“ *penicillata.*
? *Daphnella aspera.*
Chemnitzia tridentata.
“ *(?* var.*) aurantia.*
Volutella pyriformis.
Ocinebra Poulsoni, (Nutt., MS.)

Mr. Carpenter remarks that *Capsa,* H. and A. Adams, proposed for a section of *Scrobicularia,* is an objectionable name, inasmuch as *Capsa,* Lam., although a synonym of *Iphigenia,* Schum., is still much in use. He, therefore, re-constitutes, in a restricted sense, the ancient genus *Lutricola,* Blainv., for this group intermediate between *Scrobicularia* and *Macoma,* and gives the following description:—

"*Lutricola.*—Testa tumida, sæpe inæquivalvis, irregularis, subquadrata seu antice producta; pars postica undata seu truncata; cartilago fossa subinterna sita, ligamento curtiore contigua; dentes cardinales utraque valva duo, laterales nulli."

Ex. *Lutricola ephippium,* Solander, *L. alta,* Conrad, *L. Dombeyi*, Lam., &c.

Oedalia, n. g. (*Tellinidæ.*)—"Testa inflata, tenuis, æquivalvis, æquilateralis cycladiformis; margo haud hians, haud sinuatus; ligamentum et cartilago externa; dentes cardinales 3–2, bifidi, laterales nulli; sinus pallii magnus."

Mr. Carpenter also describes the genus *Lottia,* Gray, as restricted by him, as follows:—

"*Lottia.*—Testa Patellis quibusdam seu Helcioni similis; plerumque planata, solida, apice anteriori.

Animal margine pallii intus papillis lamellosis circa dorsum lateraque instructo, regione capitis interruptis; pede elongato, ovali, planato; branchia minima."

"This genus is intermediate between *Acmæa* and *Scurria.* In *Acmæa* the mantle is simple, while in *Scurria* the entire circumference is covered with protuberances; in *Lottia* the protuberances are on the body, but absent from the head.

The branchia is ordinarily elongated and feather-shaped in *Acmæa*, triangular in *Scurria*, and very small in *Lottia*. It is too early to fix definitely the conchological characters of *Lottia*. The type is different enough from the shells of the ordinary *Patellæ*, yet it is possible that some of the species believed to belong to the latter genus, will prove to be *Lottiæ* when the animals are observed."

Descriptions d'espèces nouvelles de l'Archipel Calédonien: BY M. SOUVERBIE and R. P. MONTROUZIER.

Odostomia aciculina, Souv.
“ *bulimoides*, “
Pyramidella pupæformis, Souv.
Cerithium (Triphoris) connatum, Mont.
Mitra infrafasciata, Souv.
Cypræa rhinoceros, “
Columbella funiculata, “

Additions and corrections to preceding papers: BY SOUVERBIE and MONTROUZIER.

Description d'une Colombelle de la Nouvelle Calédonie: BY H. CROSSE.

Columbella Souverbiei.

Coquilles terrestres et fluviatiles de quelques îles de l'océan Pacifique, recueillies par M. le Dr. E. Græffe: BY ALB. MOUSSON.

From the Samoan Group.

Nanina Samoensis.
“ *Upolensis.*
“ *firmostyla.*
“ *Schmeltziana.*
Patula complementaria.
“ *hystricelloides.*
Partula canalis.
Stenogyra Upolensis.
Pupa problematica.
Helicina plicatilis.
Cyclophorus Upolensis.
Omphalotropis zebriolata.
“ *perforata.*
“ *bifilaris.*
“ *bilirata.*
Hydrocena parvula.
Truncatella rustica.
Neritina humerosa.
Navicella pala.

There are also remarks on the following species:—

Patula gradata, Gould.
Helix troilus, “
“ *Eurydice*, “
“ *cressida*, “
Partula conica, “
“ *zebrina*, “
Succinea putamen, “
“ *crocata*, “
“ *modesta*, “
Pupa pediculus, Shuttl.
Pythia pantherina, A. Ad.
Melampus Philippii, Küster.
Helicina fulgora, Gould.
“ *musiva*, “
Cyclophorus tiara, Gould.
“ *strigatus*, “
Omphalotropis Navigatorum, Pfr.
Truncatella vitiacea, Gould.
Melania Samoensis, Reeve.
“ *lutosa*, Gould.
“ *Scipio*, “
“ *scitula*, “
“ *Vainafa*, “
Neritina Roissyi, Recluz.
Navicella affinis, Reeve.

From the Vitian Group.

Nanina Nouleti Guil., var. *polita.*
Nanina unisulcata,
“ *microconus.*
Lonites Vitiensis.
Helix transarata.
Partula lirata.
Helicina Vitiensis.
Omphalotropis ovata.
“ *parva.*
Melania clavulus.
Melania tuberculata, Müll., var. *Assavaensis.*
Ampullacera maculata.
Neritina Vitiensis.
“ *pulligera,* L. var. *subcanalis.*
Navicella undulata.
Batissa tenebrosa, Hinds, var. *parallela.*

Mention, generally with remarks, is also made of the following species:—

Nanina Nouleti, Le Guillou.
“ *lurida,* Gould.
“ *casca,* “
“ *scorpio,* “
“ *ruida,* “
Helix Lüdersi, Pfr.
“ *tumulus,* Gould.
Bulimus fulguratus, Jay.
“ *malleatus,* “
“ *morosus,* Gould.
“ *elobatus,* “
Physa sinuata, “
Pythia pollex, Hinds.
Helicina beryllina, Gould.
“ *pallida,* “
Omphalotropis rosea, “
Melania Cybele, “
Melania tetrica, Gould.
“ *Terpsichore,* “
“ *Plutonis,* Hinds.
“ *picta,* “
“ *aspirans,* “
“ *luctuosa,* “
“ *Feejensis,* Reeve.
“ *moesta,* Hinds.
“ *perpinguis,* Hinds.
“ *Vainafa,* Gould.
“ *Myersiana,* Lea.
“ *bellicosa,* Hinds.
Neritina sandalina, Recluz.
“ *Zelandica,* “
“ *parvula,* Le Guillou.
“ *ovalaniensis,* Lessou.
Navicella pala, Mousson.

Diagnoses d'espèces provenant de la Nouvelle-Calédonie: BY B. GASSIES.

Helix Villandrei.
“ *occlusa.*
“ *Rhizophorarum.*
Melampus albus.
Ancylus reticulatus.
Melania circumsulcata.

The name of the *Melania* is pre-occupied; we cannot ~~pay~~ pay the usual compliment of calling it *M. Gassiesii*, as that name has also been previously used.

Description d'epèces nouvelles: BY H. CROSSE.

Murex inglorius, Hab. ?
Cypræa Thomasi, Hab. ?

Description d'une nouvelle Odostomie des Côtes de France: BY P. FISCHER.

Odostomia Moulinsiana.

Description d'espèces nouvelles provenant des îles Gambier: BY H. CROSSE.

Pupa Paivæ.
Helicina Pazi.
Tornatellina Hidalgoi.
Hydrocena insularis.

Addition à la faune Malacologique de l'Indo-Chine: BY ARTHUR MORELET.

Vitrina russeola.
" *unguiculus.*
Succinea tenuis.
Helix dicaela.
Hydrocena marginata.
" *turbinata.*
Ampullaria pagoda.
Paludina Eyriesi.
Unio Paivanus.
Cyrena (*Corbicula*) *Bocourti.*
" " *castanea.*

Diagnoses Molluscorum novorum: BY H. CROSSE.

Streptaxis decipiens, Chili? *Leptopoma achatinum,* Philippines?
Columbella Isabellina. Hab.?

Note sur le genre Trochotoma et description d'une espèce nouvelle des sables de Bordeaux: BY G. P. DESHAYES.

Trochotoma Terquenri, Deshayes.

Observations sur la Note précédente: BY H. CROSSE.

Bibliographie.

In a notice of Mörch's "Catalogus Conchyliorum quæ reliquit cl. N. Ch. N. Lassen," &c., M. Crosse makes the following remarks, to which we heartily agree:—

"The author adopts, in great part, Dr. Troschel's classification, exclusively based upon the lingual dentition of the Mollusks. This system has the inconvenience of sometimes separating animals, closely allied by all their characters, by their general aspect and their manner of life, and differing only in this one particular."

GERMAN.

Abhandlungen der Naturforschenden Gesellschaft zu Gorlitz. Vol. XII. 1865.

Nachtrag zu dem Verzeichnitz der in der Preussischen Oberlausitz vorkommenden Land und Wassermollusken: BY R. PECK.

90 species are enumerated, with occasional remarks on peculiarities and particular localities.

DANISH.

Videnskabelige Meddelelser fra den Nat. Hist. Forening i Kjobenhavn, for Aaret 1863. Copenhagen, 1864.

Fortegnelse over de i Danmark forekommende Land-og Ferskvandsblöddyr: AF O. A. L. MÖRCH.

A very full list of the land and fresh water shells of Denmark, with synonymy and specific descriptions. The species are arranged in accordance with the most recent classification, and number 129.

A review of Danish malacological bibliography and a full index are added, making a most valuable work of reference. The work occupies over 100 pages.

SCIENTIFIC INTELLIGENCE.

LOCALITY OF NAVEA NEWCOMBII.—Dr. Newcomb informs us that the locality of *Navea Newcombii*, stated in our description of that species, (p. 39,) is erroneous. The specimens were extracted from a *Haliotis* from Lower California.

ON THE DISTINCTIVE CHARACTERS OF BULIMUS MARGINATUS, AND B. FALLAX.—Mr. Say described (Proceedings Acad. Nat. Sciences, vol. ii., 1821,) a minute pupæform shell, with widely reflected lip, under the name of *Cyclostoma marginata;* and in 1825 (l. c. v.) he characterized *Pupa fallax,* and remarks, that "it closely resembles *P. marginata*, nob., but is much larger, and the labrum is not widely reflected. When viewed in front, it has a reflected appearance, but the opposite view presents only a very limited excurvature. Length more than three-tenths of an inch."

In Binney's "Terrestrial Mollusks," the two species are asserted to be identical, and, inasmuch as *Pupa marginata* had been previously used by Draparnaud, the species was described and figured as *P. fallax,* Say.

Pfeiffer, in the last edition of his "Monograph of the Helices," considers the species identical, and refers them under the first name (*marginatus*) to the genus *Bulimus.* W. G. Binney ("Supplement to Terr. Mollusks,") coincides in this reference.

Among a few *Pupæ* which I recently collected in the vicinity of Philadelphia, I found some young shells of so-called *marginatus*, which attracted my attention on account of the much more rapid increase of size in their volutions, and less *pupæform* appearance, showing that when adult they would be a wider species, and more turrited. Upon comparing with specimens in my cabinet, from other localities, the difference was at once apparent.

There are, then, two species:—

Bul. (*Napæus*) *marginatus*, Say.—Lip widely reflected; form very like *Pomatiopsis lapidaria*, Say.

Synonym, *B. fallax*, Binney, Terrestrial Mollusks.

Bul. (*Napæus*) *fallax*, Say.—Lip but slightly expanded; form resembling, but a little more elevated than *Amnicola Sayana*, Anth.

G. W. T., Jr.

NEW WORKS IN PREPARATION.—Mr. E. S. Morse is preparing for publication a Monograph of the Pupadæ of the United States. He proposes to investigate the subject thoroughly, studying both the shells and soft parts. Those of our readers who have collected these shells, will greatly aid in the matter, by sending specimens by mail, for examination, to Mr. M., at Gorham, Me.

Dr. A. A. Gould is at work on a new edition of his "Invertebrata of Massachusetts," the Legislature of that State having generously testified their appreciation of the educational value of such works by granting an appropriation for its publication. The "Invertebrata," though published but twenty years ago, has long been out of print, and copies have become very hard to procure; the new edition will, therefore, be in considerable demand.

NEW LOCALITY OF LIMNÆA AMPLA, MIGHELS.—"Last year I found live specimens of this hitherto very local species, in Seabass Lake, only 15 miles from Portland, Me., and nearly 200 miles from its original place of discovery."—*E. S. Morse, in letter to the Editor.*

Plates 25 and 26 are unavoidably delayed till our October issue.

AMERICAN

JOURNAL OF CONCHOLOGY.

VOL. I. OCTOBER 1, 1865. NO. 4.

DESCRIPTIONS OF NEW SPECIES OF PHANEROPNEUMONA, INHABITING POLYNESIA.

BY WILLIAM HARPER PEASE.

1. REALIA OCHROSTOMA, Pease.

Description.—T. ovata, solida, glabra, flavida vel pallidè rosea, vix perforata; anfr. 5, convexo-rotundatis, ultimo spira paulo breviore, sutura bene impressa; apertura obliquè ovata, intus lutea; perist. continuo, anfr. penultimo adnato; sutura umbilicaris, parva, angusta.

Dimensions.—Long. 5, diam. 2½ mill.

Shell ovate, solid, smooth, pale yellow or flesh-color; whorls five, convexly rounded, the last rather less than one-half the length of the shell; suture well impressed; aperture obliquely-ovate, bright orange within; lip continuous, attached to the penultimate whorl a short distance; compressly umbilicate; umbilical channel small, narrow.

2. **Realia variabilis**, Pease.

Description.—T. ovato-conica, glabra, solidiuscula, vix perforata, albida vel pallidè lutea aut rosea; anfr. 5, convexis, ultimo ad peripheriam subcarinato, carina albida; sutura valdè impressa, interdum angulata; apertura parum obliqua, ovata, intus pallida; perist. continuo, anfr. penultimo adnato; sutura umbilicaris filo-carinata.

Dimensions.—Long. 5, diam. 2 mill.

Shell ovately conic, rather solid, smooth, whitish or pale yellow or rose-color; whorls five, convex, the last obtusely carinate at the periphery; carina of a pale color, whitish; suture well impressed, usually slightly angulated; aperture somewhat obliquely ovate, pale within; lip continuous, attached for a short distance to the penultimate whorl; compressly umbilicate, umbilical channel ribbed on its outer edge.

3. **Realia scalariformis**, Pease.

Description.—T. turrito-oblonga, fulvo-cornea, longitudinaliter costata, costis numerosis, interstitiis concavis, sub lente longitudinaliter tenuissime striatis, spira acuta; anfr. 6, convexo-rotundatis ultimo 2–7 longitudinis subæquante, basi rotundato; sutura valdè impressa; apertura rotundato-ovata; perist. continuo, anfr. penultimo adnato.

Dimensions.—Long. 3½, diam. 1½ mill.

Shell turrited, oblong, yellowish, plicately ribbed longitudinally; ribs numerous; interstices concave, and very finely striated longitudinally; apex acute; whorls six, convexly rounded, the last about 2–7 the length of the shell, rounded at base; suture deeply impressed; aperture roundly ovate: lip continuous, attached for a short distance to the penultimate whorl.

4. **Realia affinis**, Pease.

Description.—T. oblongo-ovata, solida, pallidè straminea, compressè umbilicata; longitudinaliter indistinctè plicato-costata, costis confertis subobliquis; anfr. 5, convexo-rotundatis, ultimo 1-3 longitudinis subæquante, basi rotundato, sutura benè impressa; apertura ovata, vix obliqua; perist. continuo, anfr. penultimo adnato, collumellari sub-reflexo.

Dimensions.—Long. 3, diam. 1¼ mill.

Shell oblong-ovate, solid, light straw-color, compressly umbilicate, longitudinally indistinctly plicately ribbed; ribs rather close, and somewhat oblique; whorls 5, convexly rounded, the last about one-third the length of the shell, rounded at base; suture well impressed; aperture ovate, somewhat oblique; lip continuous, attached to the penultimate whorl a short distance, slightly reflexed over the umbilicus: no distinct umbilical channel.

The above two species, together with *R. costata* (Pease) and *R. Tahitensis* (Pease), form a group, distinct in being ribbed longitudinally. Their operculum is, however, of the usual generic form.

5. REALIA LÆVIS, Pease.

Description.— T. conico-ovata, solidiuscula, lævis, fusco-cornea, angustè umbilicata; anfr. 5, convexis, transversim sub lente minutissimè striatis, ultimo 1-2 longitudinis testæ subæquans, sub-ventricoso, ad peripheriam obsoletè angulato, fascia pallide straminea cingulo; apertura elongato-ovata, posteriore acute angulata; perist. continuo, simplici; sutura umbilicali angusta, costâ circumambiente finita.

Dimensions.—Long. 5, diam. 3 mill.

Shell conically ovate, rather solid, smooth, brownish horn-color, narrowly umbilicate; whorls 5, convex, transversely very finely striated, last whorl about one-half the length of the shell, somewhat ventricose, and sometimes roundly angulate at its periphery, enriched by a narrow yellowish band, which occasionally shows itself at the sutures of the spire; aperture elongate-ovate, sharply angulate posteriorly; lip simple, continued over the columella by a callosity; umbilical channel rather narrow, carinate on its edge.

6. CYCLOPHORUS ? SCALARIFORMIS, Pease.

Description.—T. oblongo-ovata, sub-cylindracea, sinistrorsa, fulva, versus apicem rubella, lævis, compressè umbilicata, longitudinaliter costata, costis 20, vix obliquis; anfr. 6, rotundatis, sub ventricosis, sutura benè impressa; apertura circularis; perist. continuo, expanso, duplici, posteriore ad anfr. penultimo adnato; sutura umbilicali rimosa, costa circumambiente finita.

Dimensions.—Long. 3½, diam. 1½ mill.

Shell sub-cylindrical, oblong-ovate, sinistral, compressly umbilicate, light amber-color; longitudinally ribbed; ribs about 20 in number, slightly oblique; whorls 6, rounded, somewhat swollen, the spire much lessened at the apex, and the whorls smooth and of a pink color; suture distinct, and well impressed; aperture circular, the outer edge in a line with the spire; lip double, continuous, expanded, posteriorly slightly attached to the penultimate whorl; umbilical channel rather wide, rimate, and bordered by a carina, to which the longitudinal ribs extend and join.

The above interesting species we consider the type of a new genus. It may be called an operculoid *Vertigo*, as it resembles that genus very closely. The spire of two specimens we received is obtuse, but the large majority are acute at the apex, which has the appearance of shells that become decollated, two or three whorls being much smaller than the rest. The operculum is membranaceous, circular, consisting of about 5 volutions, nucleus central. We defer giving generic characters, until more species are obtained, but would propose the generic name "*Pupoidea*."

7. PTEROCYCLOS? PARVA, Pease.

Description.—T. turbinata, solida, fusco-rufescens, longitudinaliter tenuissime striata, apice acuto, late umbilicata; anfr. 4, ultimo ad peripheriam angulato et costato, basi bicostato, spira unicostata, costis rugosis; perist. continuo, anfr. penultimo vix adnato; apertura rotundato ovata.

Dimensions.—Alt. 2½, diam. 3½ mill.

Shell turbinate, depressly conical, solid; spire acute, amber-color or brownish-red, longitudinally finely striated; whorls 4, angulate and ribbed at the periphery, a single rib encircling the spire and two on the base of the shell; ribs wrinkled or granulose; whorls of the spire angulate; lip simple, continuous, attached slightly to the penultimate whorl; aperture nearly circular, angulate posteriorly; umbilicus open, comprising about one-fourth of the diameter of the shell.

We have placed this species provisionally under genus *Pterocyclos*, for reason of the peculiar shape of its operculum. It may, however, form the type of a new sub-genus. The operculum is horny, and may be described as a hollow screw. The outer end is blunt and slighly indented, the thread on the outside makes three revolutions; at the lower or open end the edge is expanded, forming a thin disc. The interior is smooth, the course of the outer threads being defined by fine striæ. The operculum is embedded and held by the disc at the lower end, also by the threads and a muscle which fills the interior cavity, so that it is very difficult to detach safely. If macerated, the operculum is likely to fall to pieces. It is possible that *Cycl. apiæ* (Recl.) and *strigatus* (Gld.) collected by the American Exploring Expedition at the Samoas, may prove to belong to the same genus as the above, although M. Recluz's description of the operculum does not agree with ours.

8. Helicina Pacifica, Pease.

Description.—T. conoidalis, lutea, solida, crassa, spiraliter striata, apice obtusa; anfr. 4, plano-convexis, ultimo ad peripheriam angulato; apertura subtriangularis; labro crasso, vix everso.

Dimensions.—Diam. 6, alt. 4 mill.

Shell conoidal, solid, thick, yellow, rarely reddish, spirally finely striated; apex obtuse; whorls 4, flatly convex, angulated at the periphery; aperture sub-triangular; lip thickened, slightly everted; columellar callosity moderate.

CATALOGUE OF THE MOLLUSCA OF GRAND RAPIDS, MICHIGAN.

BY A. O. CURRIER.

The following list of Mollusca, inhabiting the vicinity of Grand Rapids, Michigan, is offered preparatory to a more extended paper on their local characteristics, etc., and is intended to invite criticism, in view of making it more complete.

It will be observed that the number of species of *Anodonta* is somewhat large for a territory embracing less than a single county. Michigan abounds in small lakes, but few of which have been explored for Mollusca. An effort is being made the present season, by my friends, J. A. McNiel, Esq., Dr. William H. DeCamp, and myself, to more fully explore these localities within convenient distance—which will probably add—when referred to competent authority, other species to the list. Several new species have been described (this Jour., part 2, 1865,) as the result of somewhat hasty collections at a *few* localities, and rich results may be anticipated when the thousands of our small lakes have been fully explored.

HELICIDÆ.

HELICELLINÆ.

1.	OMPHALINA	FULIGINOSA,	Griff.
2.	HYALINA	ARBOREA,	Say.
3.	"	NITIDA,	Müller.
4.	"	LIMATULA,	Ward.
5.	"	VIRIDULA,	Menke.
6.	"	INDENTATA,	Say.
7.	MESOMPHIX	LIGERA,	Say.
8.	?	FULVA,	Draparnaud.
9.	HELICODISCUS	LINEATA,	Say.
10.	GASTRODONTA	MULTIDENTATA,	Binney.
11.	STROBILA	LABYRINTHICA,	Say.

12. Macrocyclis concava,	Say.
13. Pseudohyalina minuscula,	Binney.
14. Anguispira alternata,	Say.
15. Patula solitaria,	Say.
16. " perspectiva,	Say.
17. " striatella,	Anthony.

HELICINÆ.

18. Stenotrema hirsuta,	Say.
19. " monodon,	Rackett.
20. " Leai, ?	Ward.
21. Triodopsis tridentata,	Say.
22. " fallax,	Say.
23. " inflecta,	Say.
24. Xolotrema palliata,	Say.
25. Mesodon thyroides,	Say.
26. " albolabris,	Say.
27. " profunda,	Say.
28. " multilineata,	Say.

SUCCININÆ.

29. Succinea avara,	Say.
30. " obliqua,	Say.
31. " ovalis,	Gould.
32. " vermeta,	Say.

PUPADÆ.

PUPINÆ.

33. Zua subcylindracea,	Chemnitz.
34. Pupilla pentodon,	Say.
35. Leucocheila armifera,	Say.
36. " contracta,	Say.

VERTIGININÆ.

37. Isthmia Gouldi,	Binney.
38. " simplex,	Gould.

AURICULIDÆ.

AURICULINÆ.

39. Carychium exiguum,	Say.

LIMNÆIDÆ.

LIMNÆINÆ.

40. Limnæa stagnalis,	Linnæus.
41. Neristoma columella,	Say.
42. Limnophysa reflexa,	Say.
43. “ zebra,	Tryon.
44. “ umbrosa,	Say.
45. “ desidiosa,	Say.
46. “ caperata,	Say.
47. “ humilis,	Say.
48. Acella gracilis,	Jay.
49. Physa Warreniana,	Lea.
50. “ vinosa,	Gould.
51. “ heterostropha,	Say.
52. “ gyrina,	Say.
53. “ Hildrethiana,	Lea.
54. Bulinus hypnorum,	Linnæus.

PLANORBINÆ.

55. Planorbella campanulatus,	Say.
56. Helisoma trivolvis,	Say.
57. “ bicarinatus,	Say.
58. Menetus exacutus,	Say.
59. Gyraulus deflectus,	Say.
60. “ parvus,	Say.
61. Planorbula armigera,	Say.

ANCYLINÆ.

62. Ancylus fuscus,	Adams.
63. “ parallelus,	Haldeman.

STREPOMATIDÆ.

64. Pleurocera subulare,	Lea.
65. Goniobasis livescens,	Menke.

VIVIPARIDÆ.

66. Melantho integra,	Say.

AMNICOLIDÆ.

67.	Amnicola	grana,	Say.
68.	"	pallida,	Haldeman.
69.	Somatogyra	isogona,	Say.
70.	Pomatiopsis	lapidaria,	Say.

VALVATIDÆ.

71.	Valvata	tricarinata,	Say.
72.	"	" *var.* simplex,	Adams.

UNIONIDÆ.

73.	Anodonta	grandis,	Say.
74.	"	imbecilis,	Say.
75.	"	Benedictii,	Lea.
76.	"	cataracta,	Say.
77.	"	Ferussaciana,	Lea.
78.	"	glandulosa,	Anthony.
79.	"	ovata,	Lea.
80.	"	irisans,	Anthony.
81.	"	Footiana,	Lea.
82.	"	pallida,	Anthony.
83.	"	subangulata,	Anthony.
84.	"	imbricata,	Anthony.
85.	"	opalina,	Anthony.
86.	"	flava,	Anthony.
87.	"	subinflata,	Anthony.
88.	"	subcylindracea,	Lea.
89.	Margaritana	edentula,	Say.
90.	"	Shafferiana,	Lea.
91.	"	rhombica,	Anthony.
92.	"	deltoidea,	Lea.
93.	"	rugosa,	Say.
94.	"	marginata,	Say.
95.	Unio	alatus,	Say.
96.	"	cornutus,	Barnes.
97.	"	coccineus,	Hildreth.
98.	"	elegans,	Lea.
99.	"	ellipsis,	Lea.
100.	"	gibbosus,	Barnes.

101.	“	gracilis,	Barnes.
102.	“	iris,	Lea.
103.	“	lacrymosus,	Lea.
104.	“	ligamentinus,	Lamarck.
105.	“	luteolus,	Lamarck.
106.	“	occidens,	Lea.
107.	“	plicatus,	Lesueur.
108.	“	pressus,	Lea.
109.	“	rectus,	Lamarck.
110.	“	rubiginosus,	Lea.
111.	“	Schoolcraftensis,	Lea.
112.	“	subovatus,	Lea.
113.	“	tenuissimus,	Lea.
114.	“	triangularis,	Barnes.
115.	“	verrucosus,	Barnes.

CORBICULIDÆ.

116.	Pisidium	abditum,	Haldeman.
117.	“	compressum,	Prime.
118.	“	variable,	Prime.
119.	“	ventricosum,	Prime.
120.	“	virginicum,	Bgt.
121.	Sphærium	sulcatum,	Lamarck.
122.	“	solidulum,	Prime.
123.	“	striatinum,	Lamarck.
124.	“	occidentale,	Prime.
125.	“	partumeium,	Say.

DESCRIPTION OF A NEW SPECIES OF MERCENARIA.

BY GEORGE W. TRYON, JR.

MERCENARIA FULGURANS, Tryon.—t. 26, f. 1, 2, 3.

Description.—Shell short-ovate, somewhat heart-shaped; covered with concentric, raised, sharp ribs, equidistant, extending over the whole surface except the ligamental area and lunule; interstices concentrically striate; ligamental area long and narrow, and, with the lunule, closely striate. Valves convex, with the umbones elevated, and beaks recurved, sharp, and approaching closely together. Color light cream, with very narrow, light chocolate-colored, zig-zag markings; lunule and area chocolate. The same color tinges the crenulated margin, while the shell is otherwise white within.

Dimensions.—Length 40 millimetres, width 45 mill., diameter 15 mill.

Habitat.—Tampa Bay, Florida. T. A. Conrad.

My Cabinet.

Observations.—This species resembles *V. cingulata,* Lam., more than any other, in its markings, but is very distinct in form, and in the narrow, raised ridges. In *V. cingulata* the ridges are at first sharp and crenulated, but they subsequently become thicker and more obtuse.

ON THE PROPRIETY OF LEPTOXIS AS A GENERIC NAME.

BY S. S. HALDEMAN.

Speaking of Rafinesque's descriptions, Professor Agassiz says (Am. J. Sci., March, 1854, p. 299):—"Should naturalists be more generally inclined to correct simply what they consider as errors in their predecessors, instead of discarding altogether what they cannot at once determine, we should have much fewer of those nominal species in our descriptive works, which are the curse of our scientific nomenclature." And in a later number (May, 1854, p. 354):—"I do not hesitate, therefore to adopt Rafinesque's name as the older; the more so, since this writer has at the same time wisely separated from the common Catostomi, at that early day, two other types of the same group, which are even now left among Catostomi by all ichthyologists."

The American Journal of Conchology (vol. i., p. 80,) pays a high compliment to Rafinesque's genius, and states, that "each fresh mind brought to the investigation of difficult questions, will evoke *some* new truth, which his predecessors have failed to perceive." Among these we may cite the restoration of species to Linnæus and other old authors as late as the present century, and the recognition of the fact that "*Leptoxis*" indicates a definite genus. But, according to the same Journal, (last line of page 82,) "there is positively no excuse" for superseding *Anculosa* (*Anculotus?*) with *Leptoxis*.

Whether I determined *Leptoxis* from a manuscript figure or otherwise, I do not remember, nor is it to the purpose, the validity of the determination being admitted. The oldest objection to "*Leptoxis*" is, that it may indicate a short *Limnæa*, and the American Journal of Conchology, p. 111, says, that "the published description refers equally well to *Physa*, or some species of *Lymnæa*." *Two words* of Rafinesque's description settle this objection, namely, "Eyes exterior." This makes it a Strepomatid, and the character of the aperture—"almost as large as the whole shell"—demonstrates that it is a *Leptoxis*, and that the adoption of this name in my monograph is as just and as valid a restoration as can be found in the entire range of conchology.

MONOGRAPH OF THE FAMILY STREPOMATIDÆ.

BY GEORGE W. TRYON, JR.

The following pages of condensed descriptions are extracted from a much more extended paper, prepared for, and to be published by the Smithsonian Institution as one of its series of conchological works, forming a part of the "Smithsonian Miscellaneous Collections." To Prof. Joseph Henry, its able Secretary, we are much indebted for the privilege of using the numerous wood cuts intended for the illustration of the forthcoming work. It has not been deemed necessary to make any bibliographical references in this paper, as these, together with our views respecting synonymy, are very fully entered into in our "Synonymy of Strepomatidæ," first published in the "Proceedings of the Academy of Natural Sciences, Philadelphia," 1863, '64, '65, and afterwards separately in an octavo volume.* We have, therefore, confined ourselves to the citation of the specific name adopted by us in the above-mentioned work, and the current number of the species as contained therein, the latter for facility of reference.

The intention of the present paper being principally to facilitate the determination of specimens, the species have been grouped in such manner, as to render this attainable with the least possible trouble, and the descriptions are made as brief as possible, consistent with the delineation of the prominent distinctive features of the species.

Our paper, entitled "Observations on the Family Strepomatidæ," published in the 2nd No. of this Journal, may be considered as an introduction to the present one, and, as the analytical table of genera contained in the former will serve to discriminate those higher groups, we will at once commence with the enumeration of the species.

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* By Bailliere Bros., 520 Broadway, New York. Price, $2.00 cloth, or $1.75 paper.

IO, Lea.

a. Shell smooth or only slightly tuberculate.

1. **I. fluvialis,** *Say.* Figs. 1—6. Fusiform, spire conical, body whorl gibbous; lengthened into a canal at base; smooth, or slightly nodulous upon the periphery of each whorl, those of the spire nearly concealed. Light yellow, brown, olive, or nearly black, in the latter case dull red within the aperture: sometimes banded. *Holston River, W. Va., and E. Tenn.*

Figs. 1, 2, 3 are typical, 4 is *verrucosa*, Reeve, 5 and 6 are *tenebrosa*, Lea.

2. **I. inermis,** *Anth.* Figs. 7, 8. Conical, smooth, thick, spire elevated, flattened; body whorl concave above the periphery, which is rounded, scarcely angulate, without tubercles. Light brown to dark olive, bluish or reddish within, sometimes banded. *Same locality as No.* 1.

Larger than No. 1, with heavier texture, more regularly fusiform. Fig. 7 is typical, 8 is *lurida*, Anth.

b. Shell spinous, or much tuberculated.

3. **I. spinosa,** *Lea.* Figs. 9—14. Turrited, spire conical, periphery with large spines or elongated tubercles, covered, or visible on the spire; whorls seven. Light brown to dark olive, sometimes banded within. *Same locality.*

Figs. 9, 13, 14 are typical, 11 is *recta*, Anth., 12 is *gibbosa*, Anth., and 10 is *rhombica*, Anth.

4. **I. brevis,** *Anth.* Figs. 15, 16. Ovate, conic, short and heavy; canal short and wide; tubercles compressed, large, not much elevated transversely. Light brown, frequently banded within. *Same locality.*

I. spirostoma, Anth., (Fig. 16) is merely a distorted growth of this species.

5. **I. turrita,** *Anth.* Fig. 17. Conic, narrow, elevated, spinous; spines rather short and heavy, about 7 on a whorl; whorls 9; aperture pyriform, small, one-third the total length, canal short and wide; spire much lengthened; apex acute. Horn-colored or greenish, handsomely banded within. *Same locality.*

This beautiful and rare species is readily distinguished from the others by its very narrow, elongated form.

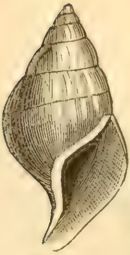


Fig. 1.

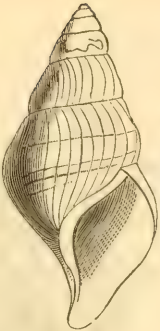
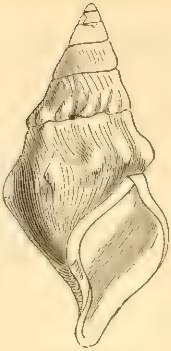


Fig. 2.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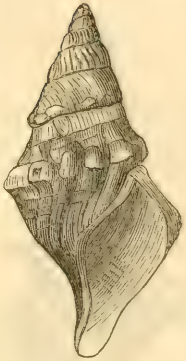
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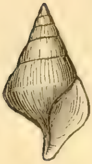
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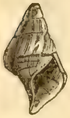
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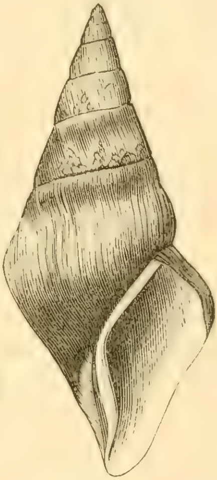
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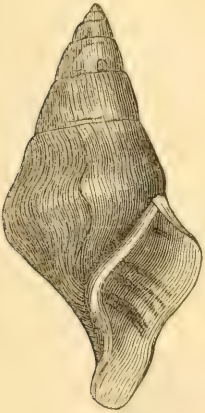
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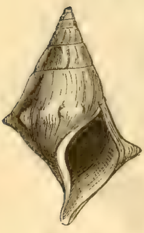


Fig. 9.

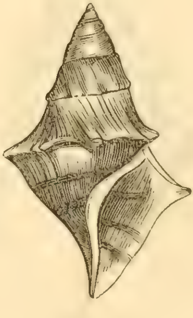


Fig 10.

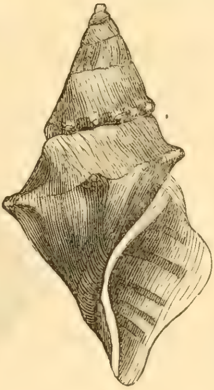


Fig. 11.

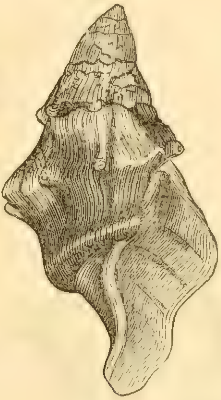


Fig. 12.

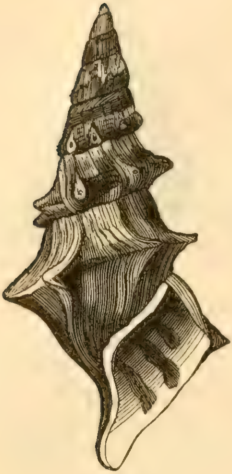


Fig. 17.

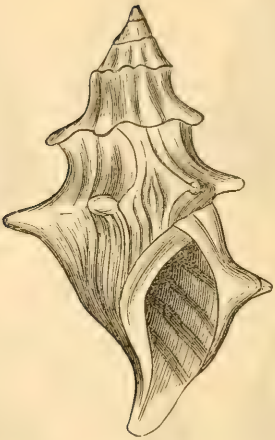


Fig. 14.

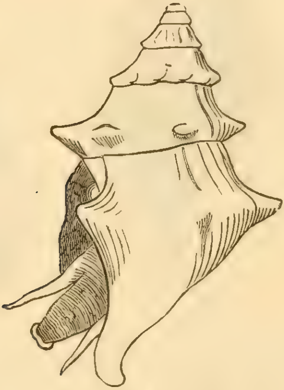


Fig. 13.

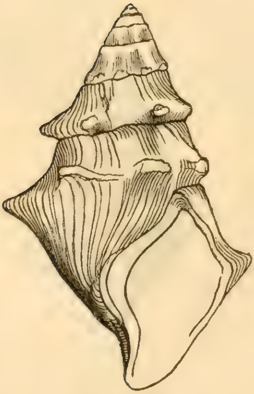


Fig. 15.

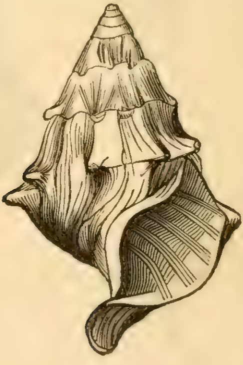


Fig. 16.

PLEUROCERA, Rafinesque.

a. Tuberculate.

1. **P. alveare,** Conr. Figs. 1—7. Short, conical, ventricose, whorls flattened, tuberculate on the periphery, base scarcely convex, concentrically striate; aperture sub-rhomboidal. Horn-color. *Tenn., North Ala.*

Figs. 1, 2, 3, 4 are typical, 4 is also *pernodosa*, Lea. Figs. 5, 6 are *torquata*, Lea, a larger variety, and Fig. 7 is *grossa*, Anth., the quite young shell of the large variety.

2. **P. Foremanii,** *Lea.* Fig. 8. Pyramidal, thick, elevated; whorls 9, flattened, the last convex; periphery tuberculate, in one or more rows, not angulate; aperture long, angular. Yellowish-brown, white within. *N. Ala.*

2a. **P. Lesleyi,** Lea. Fig. 9. Obtusely conical, pyramidal, tuberculate; spire elevated, with irregularly impressed suture; whorls 8, the initial ones plicate when perfect, the others sulcate and carinate, the carina tuberculate; aperture small, rhomboidal. Dark corneous, sometimes banded. *Pulaski Co., Ky.; E. Tenn.*

Differs from the following in the broad conical form and plicate spire.

3. **P. undulatum,** *Say.* Figs. 10, 11. Pyramidal, elevated; spire acute; whorls 8—9, flattened, with a broad central sulcation, below which is a carina, elevated at times into transverse raised tubercles; aperture oblique, rhomboidal. Brown to green, sometimes banded with brownish-red. *Ohio River and all its tributaries.*

4. **P. excuratum,** *Conr.* Figs. 12—15. Pyramidal, subulate; whorls 10—12, flattened, the periphery ornamented with close, small, oblique tubercles upon the angle; above, the body whorl is slightly excavated above the periphery, below it is striate; first few whorls closely striate when not eroded. Brown. *Tennessee River, Florence, Ala.*

Differs from *undulatum* in its narrower, more elongated form, and in the striate initial whorls. The next to last figure is *P. Spillmanii*, Lea.

5. **P. moniliferum,** *Lea.* Figs. 16—18. Pyramidal; spire elongated; suture irregularly impressed; whorls 10, flattened, sometimes obscurely sulcate, angulate and tuberculate on the periphery, striate below; aperture rather large, rhomboidal, outer lip acute, very sinuous, at base very much twisted. Yellowish or greenish, generally two-banded, white or salmon-color within. *Lower Ohio River, Ky., throughout Tenn., North Ala.*

Narrower and more elongated than *undulatum*, upper whorls not striate like *excuratum*, also distinguished from the latter by being two-banded. The 2d figure is *nodosa*, Lea, the 3d *variabilis*, Lea.

6. **P. nobile,** *Lea.* Fig. 19. Pyramidal, thick; spire elevated; whorls 9—10, flattened, the last angulate and tuberculate on the periphery, striate below; aperture rather large, rhomboidal, terminating in a narrow, rather long, twisted canal. Yellowish horn-color. *Alabama.*

Distinguished chiefly by the canal.

7. **P. robustum,** *Lea.* Fig. 20. Conical; spire elevated; whorls 10, flattened above, the last stout, convex and channelled, below the channel angled and tuberculate; aperture rather small, rhomboidal; lip sigmoid, channel rather short. Pale horn-color, obscurely banded. *Tennessee River, Ala.*

b. Sulcate species.

8. **P. canaliculatum,** *Say.* Figs. 21—25. Elevated, conical; whorls 7—9, flattened, the last with a broad, shallow groove just above the carinate angular periphery; aperture rhomboidal; canal short. Horn-color, yellowish, brownish or green, with or without bands; aperture white, or tinged with purple. *Ohio River and tributaries, northern and southern.*

9. **P. filum,** *Lea.* Figs. 26—31. Conical; whorls 8—10, flattened, the last deeply grooved, and much carinated on the periphery; base very short, nearly horizontal; aperture short, rhomboidal. Horn-color, yellowish, brownish or green, sometimes banded, white or purple within. *Tenn., Ala.*

Shorter, more conical, and more carinate and deeper grooved than *canaliculatum.*

10. **P. ponderosum,** *Anth.* Figs. 32, 33. Pyramidal, thick; spire much elevated; whorls 9, concavely flattened, the last one with a raised carina on the periphery. Reddish-brown; pale salmon-color or whitish within, sometimes narrowly banded near the base. *Tenn. River, Fox River, Ills., North Ala., Oostenaula River, Geo.*

The largest species of the genus. Differs from the above in size and the absence of the groove on the body whorl. Fig. 33 is *P. dux,* Lea.

12. **P. Troostii,** *Lea.* Figs. 34—38. Conical or pupæform, very much inflated; suture irregularly much impressed; whorls 9, convex, all of them channelled and carinate, the last inflated, with a double carina, and excavated between. Yellowish horn-color or greenish, with or without bands. *Southern Ind., Tenn., N. Geo., N. Ala..*

Figs. 37 and 38 are *P. viride* and *P. ligatum,* Lea.

12a. **P. affine,** *Lea.* Fig. 39. Pyramidal, canaliculate; spire elevated; whorls 9, flattened, the last convex, deeply canaliculate in the middle; base long; aperture rhomboidal, with a wide, well marked channel. Corneous, with or without bands. *Cumberland River, E. Tenn.*

13. **P. moriforme,** *Lea.* Fig. 40. Subcylindrical, solid; spire obtusely conical; suture impressed; whorls 9, canaliculate; aperture small, rhombic; outer lip acute, very sinuous; columella thickened below, and very much twisted. Horn-color, with a single narrow band near the base. *N. Geo.; Tuscumbia, Ala.*

14. **P. Pybasii,** *Lea.* Fig. 41. Somewhat cylindrical, pyramidal, obtuse at apex; whorls 8, flattened, with a deep, wide sulcus and raised carinate periphery. Greenish-brown, doubly banded, the upper band filling the sulcus. *Tuscumbia, Ala.*

15. **P. Showalterii,** *Lea.* Fig. 42. Subcylindrical, much lengthened, thick; spire greatly elevated; suture much impressed; whorls 9, somewhat flattened, the last convex below, striate or smooth. Horn-color or brown, with sometimes a single band at base. *N. Geo., N. Ala.*

c. Angulate species, striate below the periphery.

16. **P. Thortonii,** *Lea.* Fig. 43. Pyramidal, thick; spire regularly elevated; whorls 10, flat, the last angled but not carinate on the periphery; aperture small, rhombic; lip very sinuous; columella much twisted. Horn-color, with or without deep, wide bands. *N. Ala., Tenn.*

16a. **P. trivittatum,** *Lea.* Fig. 44. Smooth, sub-fusiform, rather thin; spire conical, pointed, carinate at apex; whorls 8, flattened, the last large, ventricose. Olivaceous, three-banded. *Tombigbee River, Miss.*

17. **P. infrafasciatum,** *Anth.* Fig. 45. Conical, smooth, solid; spire cylindrically elevated; apex decollate; whorls 8—9, slightly concave in the middle; body whorl carinate on the periphery, with below it two or three prominent striæ. Pale brown, with a single narrow band near the base. *Tenn.*

17a. **P. fastigiatum,** *Anth.* Fig. 46. Conical, smooth, moderately thick; spire elevated; apex carinate, acute; whorls 10, flattened; suture furrowed; growth-lines very strong; body carinate at the middle, and again below it; canal produced. Pale yellowish-green, with 2 reddish-brown bands. *Tenn.*

18. **P. Postellii,** *Lea.* Fig. 47. Pyramidal, obtuse; apex carinate, rather thick; whorls 8, flattened, the last rather small; periphery angulate; aperture very small. Horn-color, without bands. *Tennessee River, N. Ala.*

19. **P. incurvum,** *Lea.* Fig. 48. Pyramidal, carinate, rather thin; spire elevated; suture regularly impressed; whorls 8, flattened, the last angulate at the periphery and obscurely striate below; aperture small; outer lip extremely sinuous. Horn-color, without bands. *Florence, Ala.*

Differs from No. 18 in the great curve of the outer lip.

20. **P. Alabamense,** *Lea.* Fig. 49. Subfusiform, rather thick, carinate; spire somewhat attenuate; whorls 8, flattened, the last subangulate on the periphery, and striate below; aperture rather small. Dark horn-color. *Florence, Ala.; Powell's River, Tenn.*

Very distinct from Nos. 18 and 19 in the longer spire and canal.

21. **P. Florencense,** *Lea.* Fig. 50. Turrited, sub-carinate, rather thick; spire much elevated; suture slightly impressed; whorls 11, slightly convex, a little angulated on the periphery, Dark brown or yellowish horn-color, white or salmon-color within. *New Harmony, Ind.; N. Ala.*

No. 20 may prove to be the young of this species.

21a. **P. olivaceum,** *Lea.* Fig. 51. Conical, sub-carinate above, rather thick; spire rather obtuse; suture impressed; whorls 8, flattened, the last large, with a raised line on the periphery, the base convex; aperture large, outer lip sinuous. Olive-green. *Tombigbee River, Miss.*

22. **P. canalitium,** *Lea.* Fig. 52. Conical, canaliculate, rather thick; spire regularly conical, somewhat raised; suture impressed; whorls 7, flattened, the last canaliculate in the middle; aperture small, outer lip sigmoid. Horn-color, three-banded, white or salmon within. *Yellow Leaf Creek, Ala.; Columbus, Miss.*

23. **P. Clarkii,** *Lea.* Figs. 53, 54. Conical, obtuse, sub-carinate, rather thick; spire raised; suture impressed; whorls 8, flattened, the last rounded, with a raised line on the periphery; aperture small, outer lip sinuous. Dark olive, horn-color or deep purple. *Tenn., North and Middle Ala. and Miss.*

A common species, doubtfully distinct from *canalitium;* it appears to be rather broader, with a better developed carina and recurved canal.

24. **P. Anthonyi,** *Lea.* Fig. 55. Pyramidal, thick, rugosely striate; spire raised; suture rugosely impressed; whorls 9, flattened, the last large, rounded, with three or four raised lines on and above the periphery. Yellowish-olive. *Tenn., Ala.*

Differs from *canaliculatum* in the absence of a distinct carina and sulcation, the raised lines taking their place; the base also is longer and the fuse more obtuse and wider.

25. **P. prasinatum,** *Conr.* Figs. 56—58. Conical, subulate, smooth, solid; spire pyramidal, suture regularly impressed; whorls 9, slightly convex, the last sometimes a little channelled in the middle; aperture small, rhombic, narrowly channelled below. Greenish or reddish-brown, with or without 2 bands, white or salmon-color within. *Knoxville, Tenn.; N. Ala.*

Fig. 56 is from the type, not fully grown, Fig. 57 is *Hartmanii*, Lea, and Fig. 58 *Jayi*, Lea.

26. **P. tortum,** *Lea.* Fig. 59. Conical, smooth, rather thick; spire obtusely conical; suture much impressed; whorls 7, flattened, the last large and rounded below; aperture large, sub-rhomboidal, obtuse, broadly rounded below; lip scarcely sinuous; periphery sometimes with three or four obscure striæ. Horn-color, white or brownish within. *Little Uchee River, Geo.*

27. **P. dignum,** *Lea.* Fig. 60. Sub-fusiform, thick, slightly noduled; spire raised, conical; suture well impressed; whorls 8, flattened, the last large and convex, with several raised lines; sometimes the periphery is obscurely tuberculate; aperture ovately rhombic, produced obtusely at base. Honey yellow, with a single narrow band below the periphery, salmon or white within. *Yellow Leaf Creek, Ala.*

d. Carinate, striate Pleurocerœ.

28. **P. unciale,** *Hald.* Figs. 61—66. Acuminately turrited; spire subulate, strongly carinate; suture linear; whorls 12, the last convex, with two or three obscure angles; aperture oval, channel short and broad. Horn-color. *East and Middle Tenn., North Ala.*

Fig. 61 is typical, Fig. 62 is *sugillatum*, Reeve, Fig. 63 *bicostatum*, Anth., Fig. 64 *oblitum*, Lea, and Figs. 65 and 66 *rigidum*, Anth.

29. **P. subulare,** *Lea.* Fig. 67. Acutely turrited, rather thin; spire much elevated; apex acute; whorls 12, flat, carinate at apex; body whorl angulate on the periphery. Horn-color, generally light yellow and bluish ash below the suture. *Great Lakes, Niagara and St. Lawrence Rivers, Erie Canal.*

30. **P. subulæforme,** *Lea.* Fig. 68. Acutely turrited, rather thin; spire attenuate; suture much impressed; whorls 10, all slightly carinate, body with two or three raised lines; aperture small, channel very wide, obtuse. Horn-color. *Knoxville, Tenn.*

A stouter shell than No. 29, with the carinæ less marked, and revolving on the middle of the whorls of the spire, instead of their base. It is different in color, being light horn, without variation.

31. **P. Henryanum,** *Lea.* Fig. 69. Attenuate, subulate, carinate, thin, semi-transparent; spire elevated; suture impressed; whorls 10, flattened, the last angulate on the periphery, and 6-striate below; aperture small, sub-rhomboidal, lip very sharp and sinuous. Pale horn-color, not banded. *Tenn.*

32. **P. Lewisii,** *Lea.* Fig. 70. Sulcate, somewhat thin, conical, elevated; spire much elevated, with indistinct suture; whorls 11, flattened, covered with sulcations, of which there are 4 to 5 on the body, which is angulate on the periphery. Horn-color or dark brown, banded or without bands, white or purple within. *Illinois.*

Narrower and thinner than the next species; it is also from a far removed locality.

33. **P. annuliferum,** *Conr.* Figs. 71—74. Elevated, subconical; whorls 10—11, flattened, with elevated revolving striæ; suture obsolete; aperture sub-rhomboidal, very distinctly channelled at the base. Dark brown, within white or purplish. *Ala.*

Fig. 73 is from the type of *M. Ordiana*, Lea.

34. **P. Brumbyi,** *Lea.* Fig. 75. Pyramidal, rather thick; spire very much elevated, carinate at apex; suture obsolete; whorls 10—12, but slightly convex, thickly covered with elevated revolving striæ; aperture rather large, sub-rhomboidal, with a much twisted channel at base. Deep reddish-brown, reddish within. *Coosa River, Ala.*

35. **P. Currierianum,** *Lea.* Fig. 76. Very narrow, much elevated, sub-cylindrical; spire attenuate, with linear suture; whorls 10—12, planulate, the body whorl angulate in the middle, with one or two striæ below; aperture small, sub-rhomboidal, but little twisted below. Horn-color, banded with dark brown. *Florence, Ala.*

e. *Plicate species.*

36. **P. Sycamorense,** *Lea.* Fig. 77. Conical, rather thick; spire attenuate, pointed; suture impressed; whorls 11, somewhat convex, carinate above, plicate in the middle. Yellowish horn-color, whitish within. *Sycamore, Claiborne Co., E. Tenn.*

37. **P. plicatum,** *Tryon.* Fig. 78. Ovate conical, attenuate; upper whorls closely plicate, lower ones smooth; whorls 8, flattened, the last angulate on the periphery, and convex below; aperture produced below. Light green, with a lighter band below the suture, and two or three brown bands. *Nashville, Tenn.*

f. *Smooth, angulate species.*

38. **P. elevatum,** *Say.* Figs. 79—81. Acutely turrited; spire much elevated, sharp near the apex, carinated; suture linear; whorls 10, flat, angulate on the periphery, smooth or obsoletely striate; aperture rhomboidal, with a well developed channel. Olivaceous or dark horn-color, with or without bands, whitish or reddish within. *W. Tenn.* (?), *Ohio River, and the rivers of the North-Western States.*

The first figure is a smooth adult shell, and represents *P. elongatum*, Lea.

39. **P. gradatum,** *Anthony.* Figs, 82—84. Smooth, conical, solid; whorls 7—8, slightly concave, with a distant elevated ridge closely overlying the suture and the projecting shoulder of the succeeding whorl, so as to form a series of steps to the sub-acute apex; body whorl large, sub-cylindrical, angulate on the periphery, and striate below; aperture sub-rhomboidal; columella straight, channel deep, narrow, slightly recurved. Greenish horn-color, sometimes banded. *S. W. Va., E. Tenn.*

Fig. 82 is typical, Fig. 83 *curtatum*, Lea, and Fig. 84 *eximia*, Anth.

39a. **P. cinctum,** *Lea.* Fig. 85. Heavy, carinate; spire sub-elevated; suture impressed; whorls 7, planulate, carinate in the middle; aperture small, rhomboidal, broadly produced below. Dark corneous, whitish within. *N. Ala.*

Perhaps the same as No. 40.

39b. **P. carinatum,** *Lea.* Fig. 86. Acutely conical, carinate, thin, diaphanous; spire acute; whorls 9, carinate, above striate; aperture small, rhomboidal; lip acute, sinuous. Reddish horn-color. *Bull Run, tributary to Clinch River, E. Tenn.*

A very young shell, undoubtedly; it is not unlikely the young of No. 40.

40. **P. aratum,** *Lea.* Figs. 87, 88. Conical, rather thick; suture deeply grooved; whorls 6, flattened, carinate just above the suture; aperture small, sub-rhomboidal. Dark horn-color. *E. Tenn.*

41. **P. lativittatum,** *Lea.* Fig. 89. Sub-attenuate, carinate, rather thin, shining; spire conical; suture linear; whorls 7, flattened, angulate in the middle, with a hair-like line below it. Dark horn-color, with a broad central band of intense brown, below which the shell is yellowish. *Chikasaha River, Ala.*

41a. **P. strictum,** *Lea.* Fig. 90. Sub-attenuate, carinate, thin, semi-transparent; spire regularly conical; suture linear; whorls 6, flattened, body whorl angulate. Pale horn-color, with a single hair-like, pale brown band. *S. Carolina.*

42. **P. modestum,** *Lea.* Fig. 91. Smooth, conical; suture impressed; whorls 9, flattened, angular in the middle; aperture rhomboidal, with a rather long, straight canal. Horn-color, white within. *Tennessee River, Ala.*

Evidently the young of a large species.

43. **P. Leaii,** *Tryon.* Fig. 92. Smooth, conical; spire elevated, striate towards the apex, with a slight suture; whorls 9, flattened, obtusely angular in the middle; aperture small, sub-rhomboidal, with a short, twisted canal. Dark olive-green, lighter below the suture, white within, purple on the base of the columella. *Coosa River, Ala.*

45. **P. Tuomeyi,** *Lea.* Fig. 93. High, conical, carinate, somewhat thick; spire conical, elevated, attenuate: suture scarcely impressed; whorls 10, flattened, with a raised line in the middle, and sometimes a second obsolete one above it; aperture small, very much twisted below. Dark brown, very dark within. *N. Ala.*

Differs from No. 43 in the form of the aperture, in color, and the smooth apicial whorls.

46. **P. gracile,** *Lea.* Fig. 94. Conical, smooth, shining: spire elevated; suture regularly impressed; whorls 9, flattened, angular in the middle; aperture sub-rhomboidal, with a much twisted wide fuse below. Pale purple outside and inside. *Coosa River, Ala.*

47. **P. Spilmanii,** *Lea.* Fig. 95. Regularly conical, smooth; much raised; suture regularly impressed; whorls 9, flattened, angulate just above the suture, the body whorl with an obscure line on the angle; aperture rather small, rhomboidal; lip sinuous, with a short, wide, very much twisted canal. Dark olive, white within, sometimes banded. *Noxubee River, Miss.; Tenn.*

48. **P. planogyrum,** *Anth.* Fig. 96. Elevated, conical, smooth, thick; spire much elevated, nearly rectilinear; suture channelled; whorls 10—11, flat or concave, the periphery with a raised, rounded, sub-crenulated ridge, generally visible on the whorls of the spire. Dark horn-color, with a narrow brown band on the lower half of the whorl. *Ala.*

49. **P. pyrenellum,** *Conr.* Fig. 97. Elevated, conical, smooth; whorls 7—8, flat, the body whorl angulated in the centre; aperture large, short rhomboidal. Light greenish or brownish. *N. Ala.*

Wider, and without the raised revolving ridge of No. 48.

50. **P. Conradi,** *Tryon.* Figs. 98, 99. Narrowly elevated, acute; upper whorls carinate; whorls 8—10, flat, angulate on the periphery; aperture small, rhomboidal. Reddish-brown, inclined to yellowish under the suture, brownish within. *Ala.*

Much more narrowly lengthened than *pyrenellum*, with which it has been confounded.

51. **P. regulare,** *Lea.* Smooth, conical, rather thick; spire elevated; suture somewhat impressed; whorls 10, flattened, a little angulated on the periphery; aperture small, rhomboidal. Dark horn-color, white within. *Oconee District, Tenn.*

52. **P. validum,** *Anth.* Fig. 100. Ovate-conic, smooth, thick; spire obtusely elevated; whorls slightly rounded, 6 remaining, with strong growth-lines amounting to varices on the body; body whorl slightly convex, not distinctly angulate; aperture small, ovate, with a well-marked, short channel below. Olivaceous, bluish-white within, without bands. *Tenn.*

52a. **P. cylindraceum,** *Lea.* Fig. 101. Smooth, subcylindrical, thick; spire elevated; suture irregularly impressed; whorls 7—8, planulate, slightly impressed, the last narrow, obtusely angulate; aperture small, rhomboidal, with a broad fuse below. Horn-color, with or without bands. *Roane Co., E. Tenn.*

g. Smooth species, not angulated.

53. **P. glandulum,** *Anth.* Figs. 102, 103. Ventricose-conic, smooth, thick; spire short, acuminate; suture well marked; whorls 8, convex, rapidly increasing; body whorl bulbous; aperture moderate, elliptical, with a well-defined channel. Dark olive, with narrow white suture; aperture reddish within. *Tenn.*

53a. **P. subrobustum,** *Lea.* Fig. 104. Smooth, pyramidal, thick; spire elevated; suture impressed; whorls 9, flattened, the last whorl large, wide, flatly convex, not angled at the periphery; aperture small, obliquely oval, with a well-marked, broad, recurved fuse. Dark horn-color. *Holston River, E. Tenn.*

54. **P. Christyi,** *Lea.* Fig. 105. Elongately conical, somewhat thick; spire much elevated; suture regularly impressed; whorls 10, slightly convex; aperture small, rhomboidal, with a short, broad, recurved fuse. Horn-color, rarely banded, whitish within. *Cane Creek, Tenn.*

105a. **P. Roanense,** *Lea.* Fig. 106. Pyramidal, smooth, thick; spire pyramidal, elevated; suture impressed; whorls 9, flattened; aperture small, rhomboidal. Dark horn-color. *Holston River, E. Tenn.*

105b. **P. univittata,** *Lea.* Fig. 107. Obtusely conical, thick; spire elevated; suture impressed; whorls 7, flattened, the last sloping, convex, large; aperture moderate, a little produced below. Light olivaceous, with a single band on the periphery. *Cahawba River, Ala.*

55. **P. labiatum,** *Lea.* Figs. 108, 109. Acutely conical, smooth, rather thick, shining; spire attenuate, sharp-pointed; suture regularly impressed; whorls 10, somewhat convex, carinate towards the apex, the last whorl rather large; aperture somewhat small, rhomboidal; outer lip much dilated and very sinuous. Greenish horn-color, whitish within. *Big Miami River, Ohio.*

55a. **P. pallidum,** *Lea.* Figs. 110, 111. Attenuately conical, smooth, rather thick; spire much elevated; suture much impressed; whorls 11, slightly convex, somewhat geniculate above; aperture rather small, sub-rhomboidal; outer lip sharp, sinuous; fuse very wide and truncate. Pale horn-color. *Niagara Falls.*

56. **P. neglectum,** *Anth.* Fig. 112. Elevated, conical, rather thin; whorls 10, the upper ones nearly flat, with a slight ridge just above the suture; the ridge disappears towards the penultimate whorl, but two of them become visible on the last whorl, which is sub-angulate. Light yellow or greenish, with two dark brown bands. *Great Miami River, Ohio.*

57. **P. vestitum,** *Conr.* Figs. 113, 114. Awl-shaped, smooth, thin, diaphanous; spire long, pointed; suture slightly impressed; whorls 9, flattened above, and somewhat carinate; aperture rather small, ovately rhombic, produced below. Straw-yellow, with sometimes a brown band inferiorly. *N. Ala.*

Fig. 113 is typical, Fig. 114 is *mucronata*, Lea.

57a. **P. lugubre,** *Lea.* Figs. 115, 116. Pyramidal, smooth, somewhat thick; spire somewhat elevated; suture slightly impressd; whorls 8, flattened; aperture small, broad at the base. Dark brown, white within. *Ala.*

58. **P. strigosum,** *Lea.* Fig. 117. Acutely turrited, smooth, thin, striate above; spire drawn out; suture impressed; whorls 9, flattened; aperture small, elliptical, angular at the base. Pale yellow, bluish within. *Holston River, Tenn.*

58a. **P. pictum,** *Lea.* Fig. 118. Obtusely conical, subfusiform, thick; spire elevated, conical, carinate above; suture impressed, furrowed above; whorls 8, flattened; aperture elongated, trapezoidal; columella incurved; base of aperture angular, with rather a large sinus. Greenish-yellow, lighter below the suture, three-banded. *Holston River, Tenn.*

58b. **P. spinalis,** *Lea.* Fig. 119. Acutely conical, carinate, rather thin; spire elevated; suture excavated; whorls 10, flattened, angulate just above the suture; aperture small, ovate, angular at base. Bright yellow, double-banded. *Ala.*

59. **P. tenebrocinctum,** *Anth.* Figs. 120, 121. Ovate-conic, smooth, rather thick; spire obtusely elevated; whorls 6—8, nearly flat, obtusely carinate above the suture; aperture small, rhomboidal. Yellowish horn-color, with two bands or without bands, whitish within. *E. Tenn.*

Fig. 120 is typical; Fig. 121 is *P. parvum*, Lea, an older individual.

60. **P. Vanuxemii,** *Lea.* Fig. 122. Conical, smooth; spire elevated; suture impressed; whorls 6, somewhat convex: aperture rather small, with a short, wide fuse. Yellowish, with or without two bands, white within. *S. Carolina.*

61. **P. Chakasahaense,** *Lea.* Fig. 123. Conical, smooth, rather thin; spire attenuate; suture much impressed; whorls 8, convex, carinate above; aperture small, rhomboidal. Brownish-green, double-banded. *Chakasaha River, Ala.*

62. **P. Knoxense,** *Lea.* Fig. 124. Conical, smooth, rather thick; spire somewhat attenuate, pointed; suture impressed; whorls 8, slightly convex, carinate above; aperture small. Ferruginous, sometimes with a light line below the suture, or two well-defined, broad, brown bands. *Flat Creek, Knox Co., Tenn.*

63. **P. altipetum,** *Anth.* Fig. 125. Elevated, conical, smooth, thick; spire elevated, carinate above; whorls 10, convex, narrow, small, crowded, striate above; body whorl smooth; aperture small, elliptical, with a narrow produced fuse. Horn-color, banded at base, sometimes above the periphery also. *Raccoon Creek, Vinton Co., Ohio.*

63a. **P. Ocoéense,** *Lea.* Fig. 126. Conical, smooth, somewhat thick; spire obtuse, towards the apex lined; suture impressed; whorls 7, slightly convex; aperture small, ovate. Dark horn-color, bluish within. *Ocoee District, Tenn.*

63b. **P. corneum,** *Lea.* Fig. 127. Exserted, striate, thin, diaphanous; spire elevated; suture regularly impressed; whorls 8; sub-convex; aperture elongate, constricted, elliptic. Light horn-color. *Tenn.*

63c. **P. venustum,** *Lea.* Fig. 128. Acuminate, narrow, smooth, thin, mucronate; spire elevated; suture impressed; whorls 9, planuate; aperture oval, a little attenuate at base. Yellowish horn-color. *Big Prairie Creek, Ala.*

64. **P. hastatum,** *Anth.* Fig. 129. Elevated, conical, smooth, rather solid; spire obtusely elevated; whorls 8—9, slightly convex, occasionally spirally striate, the upper ones sub-carinate; body whorl sub-angulate; aperture small, pyriform. Dark chestnut, with a narrow yellowish band just under the angle; aperture purple within. *Ala.*

65. **P. Lyonii,** *Lea.* Elevated, conical, smooth, moderately thick; spire sub-elevated; suture impressed; whorls 6, convex, the last large; aperture small, ovate. Greenish-brown. *E. Tenn.*

66. **P. viridulum,** *Anth.* Fig. 130. Conical, smooth, rather thick; spire moderately elevated; suture impressed; whorls 8—9, slightly convex; aperture small, elliptical; lip augur-shaped, extending forward at base, and forming a broad sinus. Olive green, whitish within, never banded. *Tenn.*

Exceedingly uniform in its characters, and peculiar in its shade of color.

69. **P. striatum,** *Lea.* Figs. 131, 132. Attenuate, rather thin; spire raised; suture much impressed; whorls 8, somewhat convex, with two or three striæ, the middle one rising almost to a carina; on the body whorl there is one stria only, just below the suture; aperture oval, broadly truncately fused below. Horn-color, without bands. *Florence, Ala.*

Fig. 131 is typical; Fig. 132 is *rostellatum*, Lea.

70. **P. Knoxvillense,** *Lea.* Figs. 133. Subulate, smooth, rather thin; spire attenuately conical, sharp; suture impressed; whorls 10, slightly convex, carinate towards the apex, the last somewhat constricted. Pale horn-color. *Knoxville, Tenn.*

71. **P. Whitei,** *Lea.* Fig. 134. Attenuately conical, smooth, somewhat thick; spire much elevated; suture impressed; whorls 9, slightly convex; aperture very small, broadly truncately effused below. Dark horn-color, whitish within. *Lafayette Co., and Marietta, Geo.; Farland's Creek, Miss.; Tenn.*

72. **P. attenuatum,** *Lea.* Fig. 135. Subulate, smooth, rather thin; spire attenuate; suture impressed; whorls 9, scarcely convex, the last small; aperture small, rhomboidal, broadly effused below. Horn-color, without bands. *Lafayette, Geo.; Tenn.*

73. **P. Estabrookii,** *Lea.* Fig. 136. Attenuately conical, smooth, rather thin; spire much raised; apex acute, carinate or angulate just above the suture; last whorl slightly convex. Horn-color, whitish within, without bands. *E. Tenn.*

74. **P. modestum,** *Lea.* Fig. 137. Conical, smooth, rather thin; spire somewhat raised; suture linear; whorls 7, somewhat convex, the last somewhat compressed; aperture small, rhomboidal. Greenish horn-color, without bands, bluish-white within. *Blount Co., Tenn.*

75. **P. luteum,** *Lea.* Figs. 138, 139. Obtusely conical, smooth, rather thick, sharp-pointed; spire obtusely conical; suture impressed; whorls 8, somewhat convex; aperture rather small, rhombic. Straw-color, without bands, within whitish or brownish. *S. Carolina.*

Fig. 138 is typical; Fig. 139 represents *P. Carolinense*, Lea.

76. **P. curvatum,** *Lea.* Fig. 140. Obtusely conical; spire elevated; apex acute; suture impressed; whorls 8, convex, the last slightly canaliculate in the middle, aperture small, curved. Dark horn-color, sometimes with a band near the base. *Tenn.*

77. **P. simplex,** *Lea.* Fig. 141. Conical, smooth, rather thick; spire rather elevated; suture somewhat impressed; whorls 8, somewhat convex, the last a little constricted; aperture small, constricted, rhomboidal, with a short, narrow, recurved sinus. *Cincinnati, Ohio.*

78. **P. bivittatum,** *Lea.* Fig. 142. Conical, thick, smooth; spire obtuse; suture much impressed; whorls 7, rather convex, the last large somewhat rhomboidal; aperture rather large, somewhat attenuate below. Yellowish-green, with two distant dark brown bands, whitish within. *Tenn.*

80. **P. turgidum,** *Lea.* Obtusely conical, inflated, smooth, thick; spire short, pointed at apex, with slight suture; whorls 7, flattened, obtusely angulate in the middle; aperture small, trapezoidal. Greenish-yellow, with two to five bands. *Holston River, E. Tenn.*

81. **P. minor,** *Lea.* Fig. 143. Obtusely conoidal, smooth, rather thick; spire obtusely conical; suture impressed; whorls 7, somewhat convex, the last large; aperture large, sub-rhomboidal, produced below. Yellowish, with one or two bands, or not banded. *Tenn.*

82. **P. pumilum,** *Lea.* Fig. 144. Conoidal, rather solid, smooth, shining; spire obtusely conical; suture much impressed; whorls 7, somewhat convex, the last large, inflated; aperture large, rhomboidal, broadly effused below. Yellowish-green, doubly banded. *Tenn.*

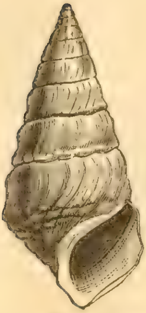
Larger, more pyramidal, with a darker epidermis, and more rhombic aperture than *Pl. bivittatum*, Lea.

83. **P. opaca,** *Anth.* Figs. 145—8. Ovate-conic, smooth, rugose; spire obtusely elevated; whorls 6, sub-convex, with very strong curved growth-lines; body whorl obtusely angulate in the middle; aperture broad ovate. Greenish-olive or very dark brown, purple within. *Tenn.*

Fig. 145 is *nigrostoma*, Anth.; Fig. 146 is *opaca*, Anth.; Fig. 147 is *iostoma*, Anth.; and Fig. 148 is *Tennesseense*, Lea.

83a. **P. napoideum,** *Lea.* Fig. 149. Obtusely conoidal, rather thick; spire short, mucronate, suture impressed; whorls 7, above slightly convex, the last inflated; aperture large, sub-rhomboidal. Horn-color, without bands, within white. *Tenn.*

84. **P. trochulus,** *Lea.* Fig. 150. Top-shaped, smooth, very much swollen; spire very obtuse; suture impressed; whorls 6, flattened above, inflated below; aperture large, rhomboidal. Yellow, with a narrow band below. *Holston River, Tenn.*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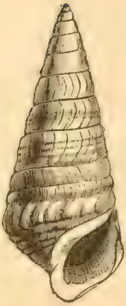
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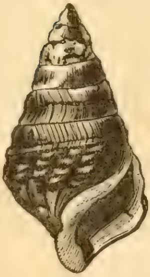
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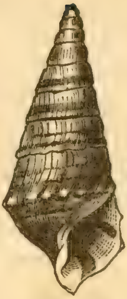
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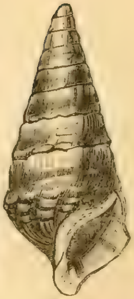
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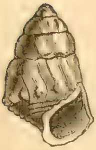
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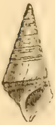
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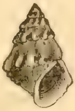
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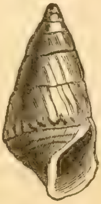
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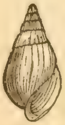
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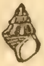
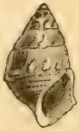


Fig. 3.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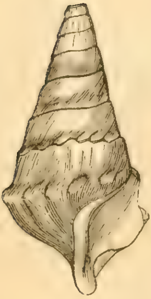
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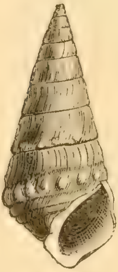
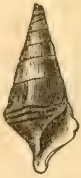


Fig. 13.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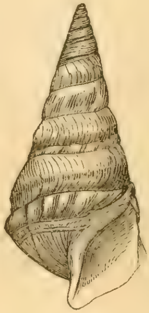
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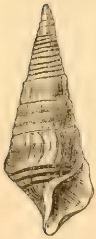
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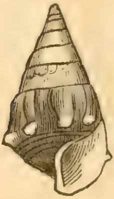
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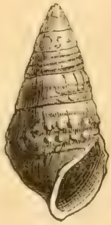
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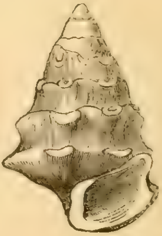
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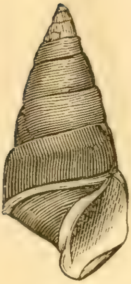
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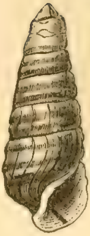
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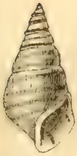
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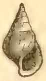
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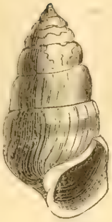
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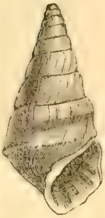
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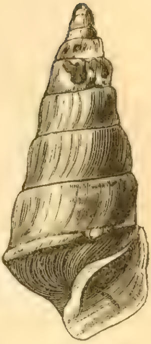
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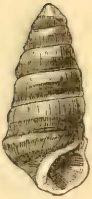
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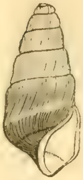
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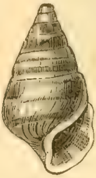
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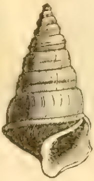
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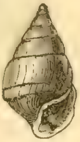
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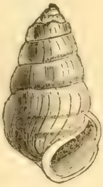
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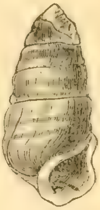
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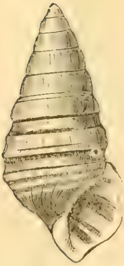
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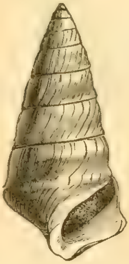
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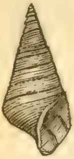
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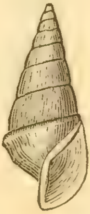
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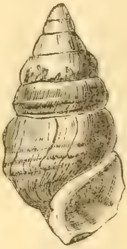
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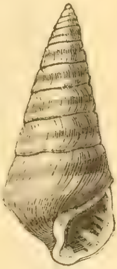
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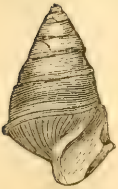
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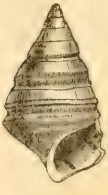
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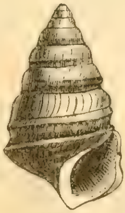
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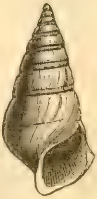
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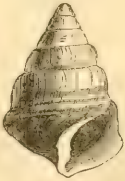
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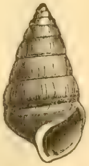
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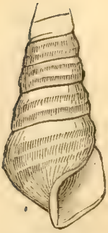
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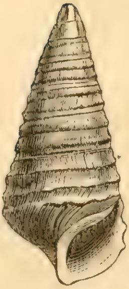
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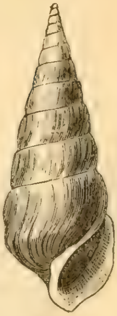
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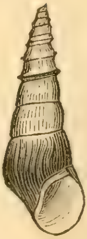
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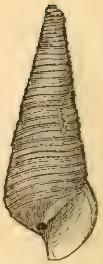
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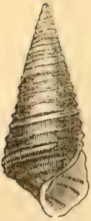
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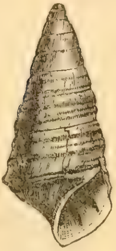
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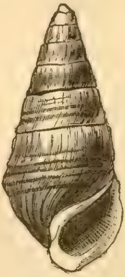
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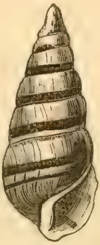
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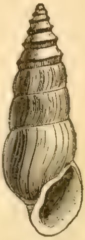
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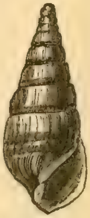
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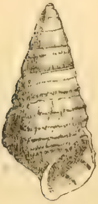
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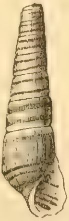
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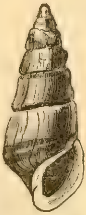
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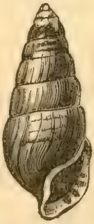
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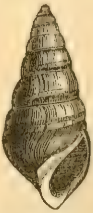
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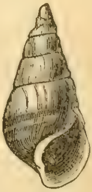
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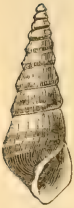
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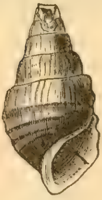
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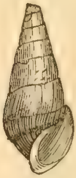
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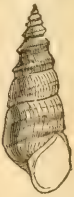
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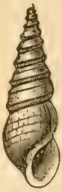
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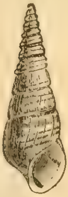
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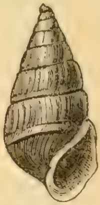
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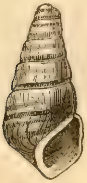
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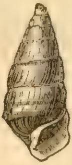
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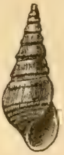
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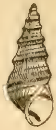
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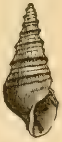
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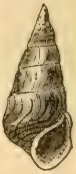
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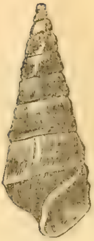
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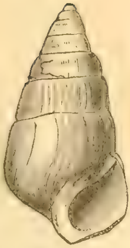
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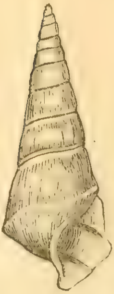
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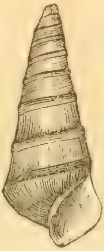
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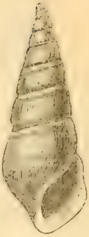
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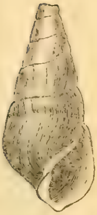
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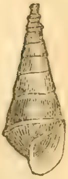
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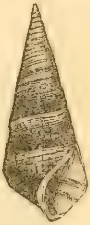
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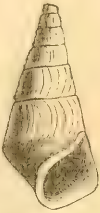
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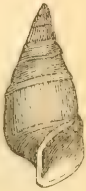
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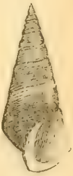
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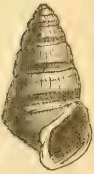
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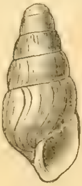
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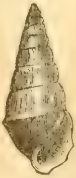
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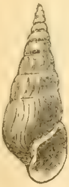
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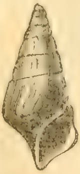
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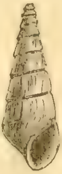
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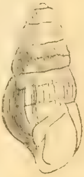
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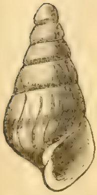
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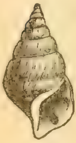
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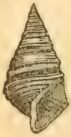
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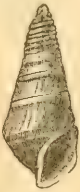
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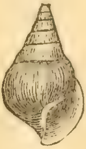
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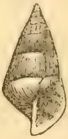
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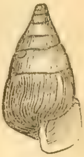
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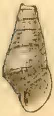
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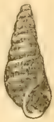
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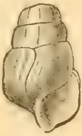
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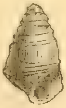
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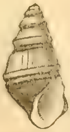
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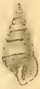
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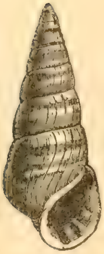
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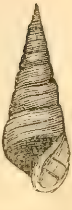
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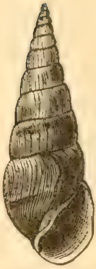
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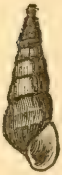
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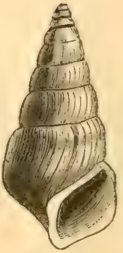
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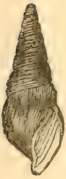
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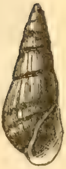
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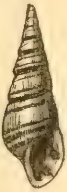
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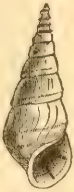
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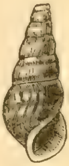
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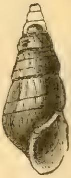
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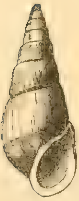
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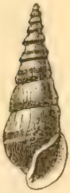
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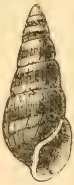
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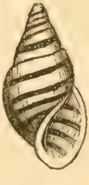
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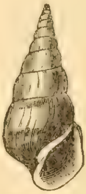
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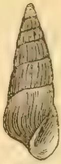
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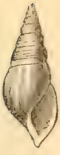
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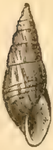
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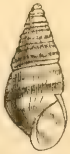
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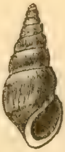
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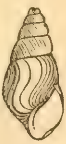
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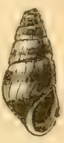
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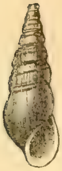
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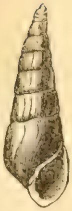
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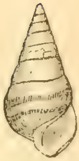
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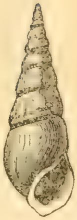
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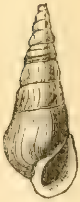
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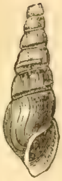
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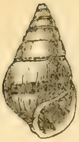
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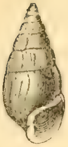
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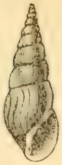
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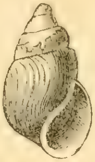
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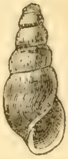
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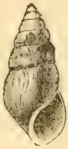
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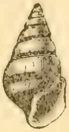
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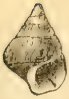
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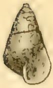
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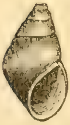
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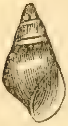
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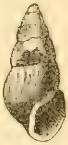
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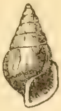
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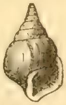


Fig. 149.

ANGITREMA, Haldeman.

a. Body whorl with a coronal of tubercles.

1. **A. geniculata,** *Hald.* Figs. 1—3. Short, ponderous; spire short, conic; body whorl inflated, geniculate; the angle with large conical tubercles. Yellowish-brown, frequently green banded; columella with a heavy white deposit, sometimes tinged with purple above and below. *E. Tenn.*

2. **A. salebrosa,** *Conr.* Figs. 4, 5. Short, sub-oval, ponderous; spire short; body whorl with a shoulder formed by numerous obtuse tubercles, with generally one or two inferior rows of tubercles, not so distinct. Yellowish-brown. *Tennessee River, Florence, Ala.*

Smaller, narrower and not so much shouldered as No. 1; the tubercles more numerous, and having a second, and sometimes third row of them.

3. **A. subglobosa,** *Lea.* Figs. 6, 7. Sub-globose, thick; spire scarcely exserted; whorls 5, the last very large, with a tuberculate shoulder. Yellowish-brown, with two, sometimes three broad green bands. *Tenn.; Coosa River, Ala.*

Wider and smaller than No. 2, with shorter spire. The broad green bands are an excellent distinguishing character.

4. **A. Tuomeyi,** *Lea.* Fig. 8. Inflated, rather thick; spire obtusely conoidal, suture impressed; whorls 5, the last slightly obliquely tuberculate below the suture, forming a slight shoulder; columella very much incurved. Dark horn-color, with narrow red bands visible within the aperture. *N. Ala.*

Spire more elevated, and tubercles proportionally smaller than in the preceding species.

b. Body whorl encircled above the aperture by two rows of tubercles, of which the inferior one is most prominent.

5. **A. Jayana,** *Lea.* Figs. 9, 10. Thick, sub-fusiform; spire exserted, conical; suture linear; body whorl with a shoulder of distant prominent, rather elevated tubercles, with another row upon the periphery; aperture sub-rhomboidal. Greenish horn-color, with generally several light green bands; aperture white or blotched with purple. *Tenn.*

c. Body whorl with a central row of tubercles.

6. **A. rota,** *Reeve.* Fig. 11. Globosely turrited, thick, ponderous; whorls few, concavely sloping, encircled around the periphery with large, obliquely compressed tubercles; aperture small, sub-rhomboidal; columella short. Yellowish olive, with a brown band at base. *"United States."*

I have not seen this species. The tubercles are described as compressed obliquely, resembling the fans of a water-wheel.

7. **A. armigera,** *Say.* Figs. 12—14. Elevated, conical; spire flatly concave; periphery angulate and tuberculate; aperture small sub-rhomboidal, acuminate below; the tubercles on the spire are partly concealed by the revolution of the succeeding whorls. Various shades of brown, with frequently, narrow bands, which are greenish without and reddish within the aperture. *Wabash River, Ind.; Ohio River, Ky.; Tenn.*

8. **A. Duttoniana,** *Lea.* Figs. 15, 16. Fusiform, somewhat conical above; whorls 5—6, flattened; suture linear, periphery tuberculate; aperture angular, elongated, acuminate at base. Yellowish, with numerous green bands, which are reddish when viewed within the aperture. *Tenn.*

Smaller and more fragile than No. 7, the tubercles only visible on the periphery, concealed entirely on the spire; aperture not so much channelled. The 2d figure is *fasciolata,* Reeve.

9. **A. stygia,** *Say.* Figs. 17, 18. Obtusely turrited; whorls slightly convex; suture distinct; body whorl ventricose; periphery a little angulated, with a few slight tubercles, sometimes obsolete; aperture wide, obtuse below. Very dark brown or black, without bands; aperture sometimes purple. *Cumberland and Tennessee Rivers.*

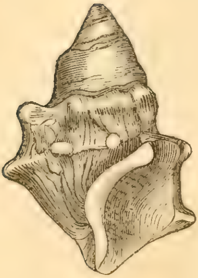
10. **A. funiculata,** *Reeve.* Fig. 19. Shortly fusiform; whorls few, flat, sharply sloping, regularly corded throughout with narrow, deeply excavated ridges; prominently keeled at the periphery; columella short; aperture scarcely channelled. Brownish olive, with four brown bands within. *Ala.*

I am unacquainted with this species.

d. Body whorl with numerous tubercles in parallel rows.

11. **A. lima,** *Conr.* Figs. 20, 21. Conic, sub-fusiform, with revolving lines of tubercles of unequal size, which become more prominent upon the angular periphery; spire conical; whorls flat; suture not well marked; aperture narrow, acuminated below. Olive or light green, sometimes with darker bands, which are purple within the aperture. *Ala.*

12. **A. verrucosa,** *Raf.* Figs. 22—26. Ellipsoidal; whorls 5; spire convex; apex obtuse; body whorl oval, with four or five equidistant revolving rows of small transverse tubercles; aperture narrow; base a little acuminate. Yellowish, with sometimes broad green bands; aperture white or purple. *Wabash River, Ind.; Ky., Tenn., N. Ala.*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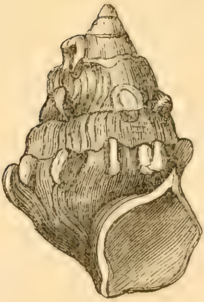
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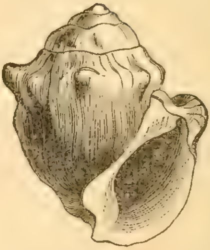
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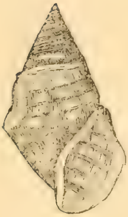
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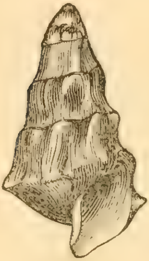
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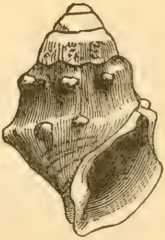
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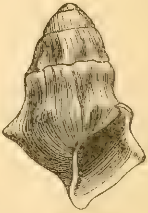
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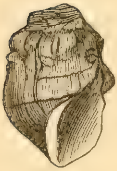
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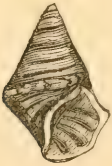
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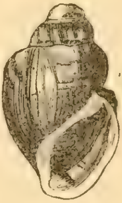
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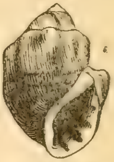
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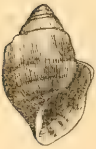
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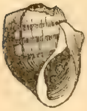
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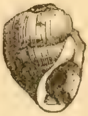
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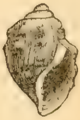
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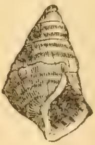
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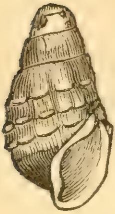
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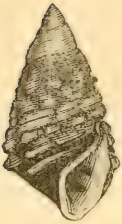
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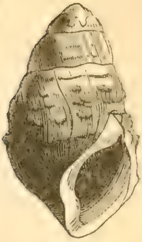
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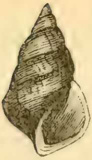
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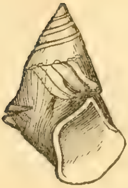
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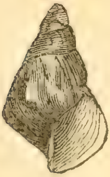
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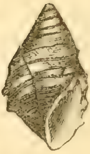
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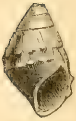
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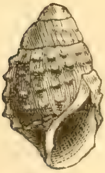
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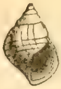


Fig. 26.

LITHASIA, Haldeman.

a. Shell large, oval, inflated.

1. **L. fuliginosa,** *Lea.* Fig. 1. Smooth, ovate, fusiform, somewhat inflated, rather thick; spire obtusely elevated; whorls 6, slightly convex; suture well impressed; body whorl oval, large; aperture large, a little angular at the base. Dark brown or green, with red bands. *Big Bigby Creek, Maury Co., Tenn.*

2. **L. Florentiana,** *Lea.* Fig. 2. Elliptical, rather thick; spire obtuse; whorls 6, convex, with well impressed suture; body whorl somewhat inflated, a little flattened above the periphery, well rounded below it, with sometimes obsolete tubercles below the suture. Light brown, with several green or red bands. *Tennessee River, Florence, Ala.*

3. **L. venusta,** *Lea.* Figs. 3, 4. Narrowly fusiform, somewhat thin; spire obtusely elevated; whorls 6, convex; body whorl elongated, convex; aperture narrow, long, acuminate below. Light yellowish, sometimes banded, white within. *Tenn., Ala.*

Narrower than No. 2, lighter in color and texture, with more prominent canal, and heavier deposit of callus.

4. **L. dilatata,** *Lea.* Fig. 5. Smooth, sub-globose, rather thick; spire obtusely conical; whorls 5, the last large and ventricose; aperture large, sub-rhomboidal, angular below; columella incurved; lip sharp and dilated. Grayish-green, yellowish below the suture, obscurely banded; aperture brown within, margined with white. *Tenn.*

5. **L. imperialis,** *Lea.* Fig. 6. Somewhat tuberculate, thick; spire raised, conoidal; suture irregularly and much impressed; whorls 6, the last large, wrinkled above, inflated; aperture small, elongately rhomboidal, channelled and recurved at base. Dark horn-color, within white, with brown hair-like lines. *N. Ala.*

b. Shell small, compact, oval, elliptical.

6. **L. vittata,** *Lea.* Fig. 7. Smooth, cylindrical, thin; spire short; last whorl very large, flattened. Dark horn-color, banded. *Coosa and Cahawba Rivers, Ala.*

7. **L. Showalterii,** *Lea.* Fig. 8. Smooth, elliptical, rather thick; spire obtusely conical; suture much impressed; whorls 6, the last large and somewhat flattened. Yellowish horn-color, generally 3-banded. *Cahawba River, Ala.*

8. **L. nuclea,** *Lea.* Fig. 9. Smooth, ovate, elliptical, thick; whorls 5, the last large, slopingly inflated. Yellowish-olive, 3-banded with green. *Coosa River, Ala.*

9. **L. nucleola,** *Anth.* Figs. 10, 11. Smooth, very thick, eroded, ovate, cylindrical; last whorl very much flattened around the upper half; aperture small, oval. Light brown, sometimes with 2 chestnut-colored bands. *Tenn.*, *Ala.*

10. **L. undosa,** *Anth.* Figs. 12, 13. Wrinkled, thick; whorls 6—7, convex, rapidly converging to the apex; body whorl cylindrical, with a distinct, but rounded shoulder; aperture small, rhomboidal. Brown or olive, sometimes brown-banded. *Ky.*

Fig. 12 is typical (and young); Fig. 13 is the adult shell—*rarinodosa.* Anth.

11. **L. obovata,** *Say.* Figs. 14—16. Sub-obovate, thick; spire almost flat; whorls 5, the body whorl large, inflated above, acuminate towards the base. Dark brown. *Kentucky and Ohio Rivers.*

Fig. 14 represents a mature shell, Fig. 15 is nearly so, and Fig. 16 described by Mr. Lea as *Hildrethiana*, the young.

12. **L. consanguinea,** *Anth.* Fig. 17. Ovate, smooth, thick; spire short, acuminate; whorls 8, last two or three much shouldered; body whorl large, slightly constricted above. Brownish-olive, light purple within, faintly banded. *Ind.*

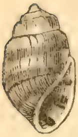
Whorls more convex, more numerous, and without the prominent angular shoulder of *L. undosa*, Anth.

13. **L. compacta,** *Anth.* Fig. 18. Ovate-conic, smooth, thick; spire obtusely elevated; whorls 5, body whorl large, sloping, sub-angulated near the base; aperture ovate, rounded at base. Yellowish-green, with 3 very dark brown bands, white and banded within. *Ala.*

15. **L. brevis,** *Lea.* Smooth or striate, sub-cylindrical, thick; spire rather short; suture impressed; whorls flattened; aperture ovate. Yellowish-brown, white within. *Ala.*

16. **L. fusiformis,** *Lea.* Fig. 19. Sulcate obsoletely, distantly folded, fusiform, rather thin; spire conical; whorls 6, the last inflated; aperture elongate-rhomboidal, narrow, channelled at base. Reddish-brown, 4-banded, white and banded within. *Coosa River, Ala.*

17. **L. Downiei,** *Lea.* Fig. 20. Sparsely nodulous, sub-cylindrical; spire raised, obtusely conoidal; suture irregularly impressed; whorls 7, flattened, last rather large; aperture large, rhomboidal. Chestnut-color, with several indistinct bands, white and banded within. *Cumberland River, Tenn.*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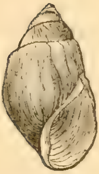
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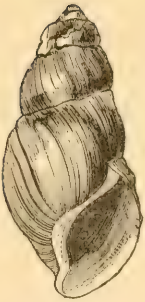
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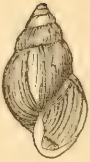
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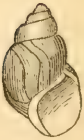
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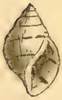
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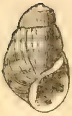
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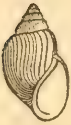
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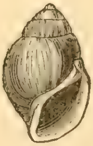
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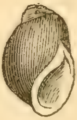
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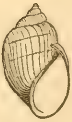
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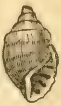
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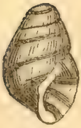
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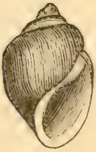
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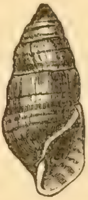
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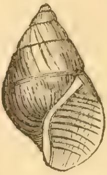
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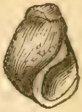
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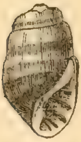
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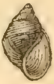
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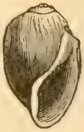


Fig. 15.

STREPHOBASIS, Lea.

a. Shell ovate-conical.

1. **St. curta,** *Hald.* Figs. 1, 2. Smooth, ovate-conical, thick: spire plane, obtusely conical; suture impressed; aperture small, sub-quadrate. Greenish or chestnut, with a broad band or without band. *Tenn., Ky.*

Fig. 1 is typical; Fig. 2 represents a well-grown specimen, and is *solida*, Lea.

2. **St. pumila,** *Lea.* Fig. 3. Smooth, obtusely conical, moderately thick; spire plane; suture much impressed; body whorl sloping, cylindrical, closely striate below the periphery; aperture small, narrow, oblique. Dark horn-color, whitish within. *Tuscaloosa, Ala.*

3. **St. carinata,** *Lea.* Fig. 4. Carinate, sub-fusiform, inflated, rather thin; spire conical, acute, carinate; whorls 6, flattened, body whorl inflated; aperture large, rhomboidal, produced below. Greenish, 4-banded. *Tennessee River, Tenn.*

Quite young, but doubtless different from the other species.

b. Shell cylindrical.

4. **St. olivaria,** *Lea.* Fig. 5. Smooth, elliptical or cylindrical; spire elevated, obtuse; suture much impressed; whorls 7, convex, the last large; aperture 2-5ths the total length, rhomboidal, broadly effused below. Dark olive, generally banded; white or purple, and sometimes banded within.

4a. **St. Lyonii,** *Lea.* Fig. 6. Sub-cylindrical, smooth, thick; spire obtusely conical; suture impressed; whorls 8, slightly convex, the last inflated, cylindrically flattened; aperture sub-constricted, rhomboidal, canaliculately retrorse at base. Dark horn-color, rarely banded, white within. *Holston River, Knoxville, Tenn.*

5. **St. plena,** *Anth.* Figs. 7, 8. Smooth, thick, shining; spire obtuse, short, carinate at apex; upper whorls a little convex, the last one constricted; aperture long, narrow above, square below. Dark brown or greenish, much banded, bluish and banded within. *Chattanooga, Tenn.; Ala.*

Fig. 8 is *St. Spillmanii*, Lea.

6. **St. cornea,** *Lea.* Fig. 9. Smooth, thick; spire obtuse; suture irregularly impressed; whorls a little convex above, the last one constricted; aperture elongate-rhomboidal, narrow above, wider below, base narrowly channelled. Horn-colored, yellowish-white within. *Chattanooga, Tenn.*

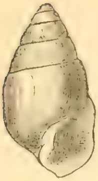
Lighter colored than No. 5, and without bands; it is also a heavier shell.

7. **St. corpulenta,** *Anth.* Fig. 10. Smooth; spire conical; apex rather acute; whorls 6—7, convex, closely revolving and rapidly increasing in diameter; body whorl much inflated, cylindrical; aperture narrow-ovate, broader at base. Yellowish, with 2 dark broad bands. *Ala.*

Body whorl more swelled out in its superior portion than either of the preceding.

8. **St. bitæniata,** *Conr.* Fig. 11. Smooth; spire short, conic, eroded; whorls 5; body very convex, cylindrical; aperture sub-rhomboidal, half the total length, much recurved at base. Olive, with two distant broad brown bands. *Black Warrior River, Ala.; Chattanooga, Tenn.*

Smaller than the preceding species of the group.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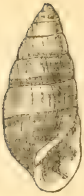
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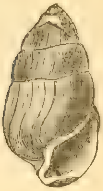
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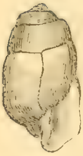
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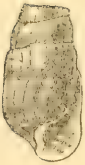
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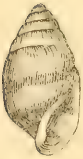
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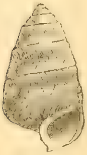
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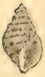
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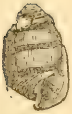
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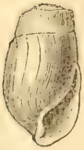
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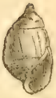
Fig. 3.

MESESCHIZA, Lea.

1. **M. Grosvenorii,** *Lea.* Fig. 1. Smooth, fusiform, thin, obtusely conical; suture slightly impressed; whorls 7, slightly convex, the last large; aperture large, rhomboidal; lip acute, in the middle slightly cut. Greenish-purplish within and without, sometimes banded. *Wabash River, Ind.*

Fig. 1 is from the type.

SCHIZOSTOMA, Lea.

SYNOPTICAL TABLE OF SPECIES.*

Fissure direct, narrow, and deep.	*Fissure oblique, short, and wide.*
1. Shell striate or ridged.	
a. *Shell conical; spire lengthened, sharply carinate.*	
1. S. CARINIFERUM, Anth.	15. S. PAGODUM, Lea.
S. Showalterii, Lea.	16. S. PYRAMIDATUM, Shutt.
2. S. CASTANEUM, Lea.	17. S. WETUMPKAENSE, Lea.
	S. ornata, Anth.
	S. pagoda, Lea, of Reeve.
b. *Shell conic-cylindrical; spire obtuse, not carinate.*	
3. S. OVOIDEUM, Shutt.	18. S. ALABAMENSE, Lea.
	19. S. ANTHONYI, Lea.
4. S. EXCISUM, Lea.	20. S. BABYLONICUM, Lea.
	S. Spilmanii, Lea.
c. *Shell globosely-ovate; spire moderate.*	
5. S. PUMILUM, Lea.	21. S. BUDDII, Lea.
S. globosum, Lea.	*S. funiculatum,* Lea.
S. Alabamense, Lea.	*S. pagodum,* Lea, of Reeve.
S. Showalterii, Lea, of Reeve.	
2. Shell smooth.	
d. *Shell elliptic.*	
6. S. ELLIPTICUM, Anth.	
7. S. LACINIATUM, Lea.	
e. *Shell quadrately cylindrical.*	
8. S. AMPLUM, Anth.	22. S. DEMISSUM, Anth.
9. S. NUCULUM, Anth.	*S. Hartmanii,* Lea.
	23. S. CONSTRICTUM, Lea.
	S. rectum, Anth.

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* The *Schimostomæ* contain two nearly equal groups, characterized respectively by a narrow, direct, and an oblique, short, wide slit.

In the above table the opposite species in the two groups are generally exactly similar, except in the character of the slit!

10. S. CYLINDRACEUM, Mighels.

f. *Shell ovate, whorls obliquely flattened, spire obtuse.*

11. S. BULBOSUM, Anth.
    S. ovalis, Anth.
12. S. CURTUM, Mighels.*
13. S. GLANS, Lea.

g. *Shell globose.*

14. S. SPHÆRICUM, Anth.

24. S. SALEBROSUM, Anth.
    S. robustum, Anth.
    S. rectum, Anth., of Reeve.
25. S. GLANDULUM, Lea.
26. S. INCISUM, Lea.
    S. virens, Lea.
    S. quadratum, Anth.
    S. obliquum, Anth.

1. **S. cariniferum,** *Anth.* Figs. 1, 2. Cylindrically-conic, transversely distantly ribbed, thick; suture impressed; whorls 7, flattened; fissure large and deep; aperture small, elliptical. Chestnut, banded within.

Fig. 1 is from the type; Fig. 2 represents *Showalterii*, Lea.

2. **S. castaneum,** *Lea.* Fig. 3. Conical, carinate, rather thick; spire exserted, strongly carinate just above the suture; suture much impressed; whorls 6, flattened, the last slightly convex, obsoletely angular and 2-ribbed at the periphery; fissure straight, narrow and deep; aperture small and elliptical. Dark brown, 4-banded.

3. **S. ovoideum,** *Shuttl.* Fig. 4. Conoidal, thick, concentrically striate-costate; whorls 5, thickened at suture; fissure very long and narrow. Olivaceous, brown-banded.

4. **S. excisum,** *Lea.* Fig. 5. Sub-fusiform, rather thick, striate; spire ovately conical; suture impressed; whorls flattened; fissure long and narrow. Yellowish, banded.

5. **S. pumilum,** *Lea.* Figs. 6—8. Top-shaped, striate, rather thin; spire obtusely conical; suture impressed; whorls 6, ventricose, the last very large; fissure straight and rather short; aperture rather small, angular and somewhat channelled at the base. Pale horn-color, sometimes 3-banded.

Fig. 6 is typical; Fig. 8 is *Sch. globosa*, Lea.

6. **S. ellipticum,** *Anth.* Oblong-ovate; spire rather produced, obtuse; whorls flatly convex, smooth, faintly rudely plicated towards the apex; fissure deep; aperture narrow-ovate. Yellowish-olive, with 3 broad dark bands.

7. **S. laciniatum,** *Lea.* Obtusely conical, smooth, rather thick; spire obtuse; suture excavated; whorls convex; fissure deep; aperture elliptical. Yellowish horn-color, banded.

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* Synonym of *bulbosum?*

8. **S. amplum,** *Anth.* Figs. 9, 10. Ovate, smooth, rather thick; spire conical; apex acute; suture impressed, with a cord-like stria; whorls 6—7, sub-convex, the last large, striate, sub-cylindrical; fissure rather large, deep and waved; aperture elliptical. Olivaceous, banded.

Distinguished by its quadrate form.

9. **S. nuculum,** *Anth.* Fig. 11. Obtusely conical; whorls convex, smooth, the last large, sub-cylindrical; fissure deep; aperture narrowly ovate, a little effused at the base. Fulvous, without bands.

10. **S. cylindraceum,** *Mighels.* Cylindrical, thick, with obsolete revolving undulations; spire ovate-conic; whorls 3—4, flattened, shouldered; suture distinct; aperture oval; fissure deep and wide. Olivaceous.

This species is known to me only through the description.

11. **S. bulbosum,** *Anth.* Figs. 12, 13. Ovate, striate, rather thick; spire obtusely elevated, sub-convex; suture very distinct, shouldered; whorls 4, the last inflated, convex, subangulated a little below the suture; fissure straight, very narrow, not deep. Dark olive, with 3 broad bands, dusky within.

Fig. 13 is *Sch. ovalis*, Anth.

12. **S. curtum,** *Mighels.* Sub-globose, short, smooth, thick; spire short, obtuse, eroded; suture slightly impressed; whorls, 3—4 remaining, flattened in the middle; aperture pear-shaped. Epidermis dark green, with 2 or 3 darker bands.

Known to me only through the description.

13. **S. glans,** *Lea.* Fig. 14. Ovately conical, smooth, or obsoletely striate, thick, inflated; spire obtusely elevated; suture corded, regularly impressed; whorls 6, the last rather large, elliptical; fissure straight, narrow, deep; aperture rather small, elliptical. Yellowish horn-color, or chestnut-brown, obsoletely banded.

Resembles *bulbosum*, Anth., but is more inflated and heavier, the color is lighter, the bands narrower, and striation obsolete.

14. **S. sphæricum,** *Anth.* Fig. 15. Sub-globose; spire small, somewhat immersed; whorls smooth, very convex, inflated. Yellowish-olive, encircled with interrupted greenish-black fillets.

15. **S. pagoda,** *Lea.* Fig. 16. Conical, strongly carinate, rather thick; spire elevated, conical; suture much impressed; whorls 6; fissure small; aperture elliptical. Dark horn-color.

16. **S. pyramidatum,** *Shuttl.* Pyramidal, thickened, concentrically sulcately costate, frequently nodosely geniculate; whorls 5—6; fissure wide, short. Olivaceous or blackish, banded with brown.

This species is unknown to me.

17. **S. Wetumpkaense,** *Lea.* Figs. 17, 18. Ovately conical, striate, thick; spire obtuse, conoidal; suture much impressed; whorls 6, flattened, carinate and ridged, the last large, angular at periphery; fissure short, oblique. Light brown, banded.

Fig. 17 is typical; Fig. 18 is *ornata*, Anth.

18. **S. Alabamense,** *Lea.* Fig. 19. Elliptical, thick, closely and regularly striate; spire obtusely conical; suture much impressed; whorls 6, the last large, inflated, cylindrical; fissure short, oblique; aperture ovate. Yellowish-olive, with broad brown bands.

19. **S. Anthonyi,** *Reeve.* Figs. 20, 21. Conical, ovate, rather thick; spire produced; whorls sloping round the upper part, concavely impressed round the middle, the last with a single dark ridge; fissure short. Fulvous brown, narrowly banded.

20. **S. babylonicum,** *Lea.* Figs. 22—24. Sub-cylindrical, striate, rather thick; spire obtuse, conoidal; suture impressed; whorls 6, flattened, the last large; fissure oblique, short; aperture large, ovate, obtusely angular at base. Yellowish-brown, with 3—4 heavy bands.

Fig. 22 is typical; Figs. 23 and 24 are *Spillmanii*, Lea.

21. **S. Buddii,** *Lea.* Figs. 25, 26. Sub-fusiform, striate, thick; spire obtusely conical; suture irregularly impressed; whorls 6, rather inflated; fissure small, oblique; aperture large, rhomboidal. Dark horn or chestnut, sometimes banded.

Fig. 26 is *Sch. funiculatum*, Lea.

22. **S. demissum,** *Anth.* Figs. 27, 28. Cylindrical, short, thick, wide; spire conoidal, eroded; suture very much impressed; whorls flattened, rugose; fissure straight, broad and rather deep. Dark horn-color,

Fig. 27 is typical; Fig. 28 is *Hartmanii*, Lea.

23. **S. constrictum,** *Lea.* Figs. 29, 30. Fusiform-cylindrical, smooth, somewhat thin; spire obtuse; suture beaded, and much impressed; whorls 5, constricted in the middle; fissure rather large, somewhat oblique; aperture large, narrow-ovate. Yellowish-horn-color.

Fig. 30 is *Sch. rectum*, Anth.

23a. **S. Showalteriana,** *Lea.* Fig. 31. Cylindrical, narrow, smooth, thick; spire exserted; suture well impressed, beaded; whorls 5, slightly convex; body whorl very small; fissure small; aperture small, elliptical. Yellowish-brown, without bands.

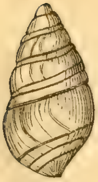
24. **S. salebrosum,** *Anth.* Figs. 32—34. Fusiform, robust, thick; growth-lines nodulously raised around the upper part of the body whorl; whorls 5, sub-cylindrical; fissure open, waved, not deep; aperture large, ovate. Brownish-olive, with 3 dark bands.

Fig. 32 is typical; Fig. 33 is *Sch. robustum*, Anth.

25. **S. glandula,** *Lea.* Fig. 35. Oval, short, smooth, much inflated, rather thick, minutely striate; spire short, conic; suture much impressd; whorls 6, the last large and swollen; fissure short, oblique; aperture rather large, elliptical, white within. Yellowish horn-color, banded.

26. **S. incisum,** *Lea.* Figs. 36—38. Ovate, smooth, thick, inflated; spire short; whorls 4—5, flattened; body whorl large; fissure wide, oblique, short; aperture long and narrow. Yellowish-brown, sometimes banded.

Fig. 36 is typical; Fig. 37 is *S. quadratum*, Anth.; Fig. 38 is *S. virens*, Lea.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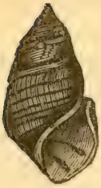
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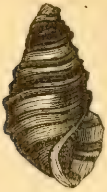
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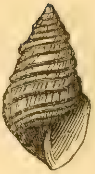
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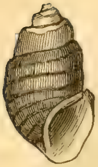
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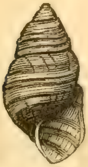
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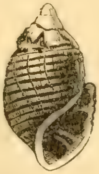
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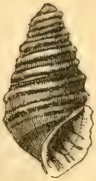
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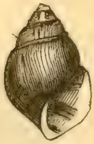
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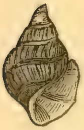
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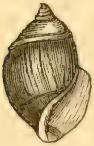
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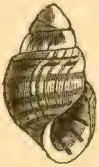
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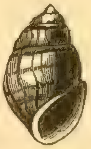
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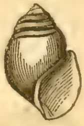
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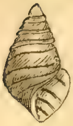
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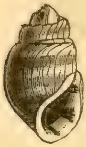
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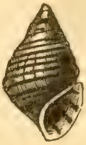
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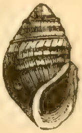
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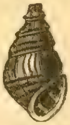
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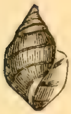
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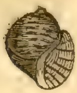
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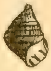
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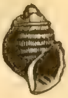
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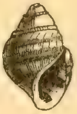
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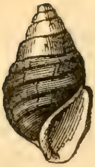
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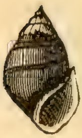
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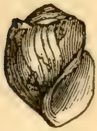
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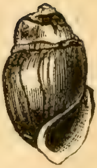
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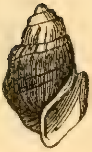
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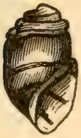
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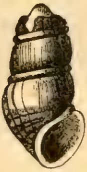
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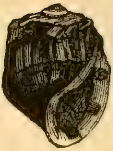
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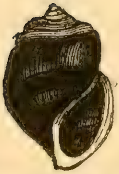
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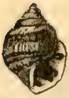
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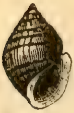
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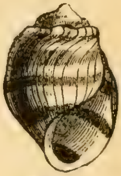
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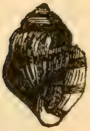
Fig. 37.

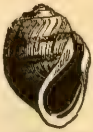
Fig. 36.

EURYCÆLON, Lea.

1. **E. umbonata,** *Lea.* Fig. 1. Sub-fusiform, rather thick, nodulous; spire obtuse; suture well impressed; whorls 5—6, the last very large, elliptical, inflated, obtusely noduled around the upper part; aperture rather large, sub-elliptical, attenuate at base. Dark green, obscurely banded. *Cumberland River, E. Tenn.*

2. **E. midas,** *Lea.* Fig. 2. Elliptic-cylindrical, smooth, somewhat thick; spire very obtuse; suture irregularly impressed; whorls somewhat compressed, the last very large, sometimes tuberculately shouldered below, obscurely striate; aperture large, ear-shaped, obtusely angular at base. Greenish, obscurely banded. *Coosa and Alabama Rivers, near Wetumpka, Ala.*

3. **E. gratiosa,** *Lea,* or **E. lachryma,** *Anth.* Figs. 3—5. Obtusely fusiform, somewhat thick, smooth or striate; spire obtusely conical; suture impressed; whorls 6, flattened, the last angulate at the periphery, with 4 large nodules upon the angle; aperture large, sub-rhomboidal, angulate below. Yellowish-green, with or without bands. *Coosa River, Ala.*

Fig. 3 represents *gratiosa,* Lea; and Figs. 4, 5, *lachryma,* Anth. I cannot ascertain which name has priority.

4. **E. gibberosa,** *Lea.* Fig. 6. Sub-fusiform, thick, smooth; spire obtusely elevated; suture well impressed; whorls slightly convex, hump-backed, the last very large; aperture very large, sub-rhomboidal, broadly angular below. Brownish, with or without bands, white within. *Alabama River.*

5. **E. nubila,** *Lea.* Fig. 7. Elliptical, sub-fusiform, rather thick, irregularly striate; spire obtusely elevated; suture much impressed; whorls 6, convex, inflated, the last large, obscurely nodulously folded; aperture large, ear-shaped, broadly angular at base. Dark green, obscurely spotted and frequently 4-banded, bands broad and purple. *Coosa River, Wetumpka, Ala.*

6. **E. Anthonyi,** *Budd.* Fig. 8. Ovate-rhomboidal; spire short; whorls 4, the upper ones much eroded, the last very large, inflated, embracing nearly the entire length of the shell, shouldered above by 4 or 5 large obtuse tubercles; aperture ovate, effused above and below; columella dilated over the umbilical region. Yellowish-olivaceous, with 2 brown bands. *Holston River, Tenn.*

7. **E. crassa,** *Hald.* Figs. 9—11. Globose, conical, ponderous; spire exserted; whorls 5, flat or slightly convex, the last much inflated, convex, with broad, heavy growth-lines; aperture large, ovate, acuminate-angular below; the columellar lip much dilated over the umbilical region. Olivaceous or brownish, frequently banded. *Clinch River, Tenn.*

Fig. 11 represents *Leptoxis pisum*, Hald.

8. **E. turbinata,** *Lea.* Fig. 12. Sub-rotund or top-shaped, thick, smooth; spire small, obtuse, scarcely elevated; suture much impressed; whorls 4, the last very large, obovate; aperture large, ovate, recurved at base; columella truncate. Dark horn-color, 3-banded, white within. *N. Ala.*

[*To be Continued.*]

EURYCÆLON.

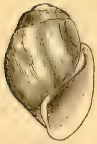
Fig. 1.

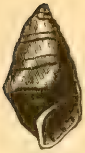
Fig. 3.

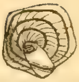
Fig. 5.

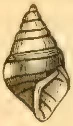
Fig. 4.

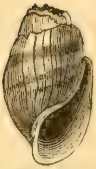
Fig. 2.

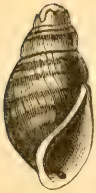
Fig. 6.

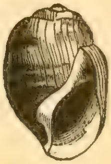
Fig. 8.

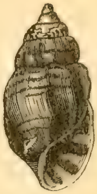
Fig. 7.

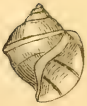
Fig. 10.

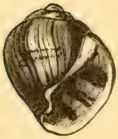
Fig. 12.

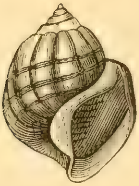
Fig. 9.

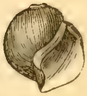
Fig. 11.

MESESCHIZA.

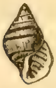
Fig. 1.

CATALOGUE OF HELICES INHABITING THE WEST COAST OF AMERICA, NORTH OF CAPE ST. LUCAS, AND WEST OF THE ROCKY MOUNTAINS;

TOGETHER WITH REMARKS UPON SOME OF THE ANIMALS, AND THEIR SPECIAL DISTRIBUTION.

BY W. NEWCOMB, M. D.

1. HELIX FIDELIS, Gray.

H. Nuttalliana, Lea.

This species ranges from the banks of the Columbia River, south to Humboldt Bay, in California. It presents variations in the coloring of the shell, sufficiently striking to make several distinctly marked varieties. We have it passing from a bright buff, with or without chestnut-coloured bands and blotches, into a more or less intense black, with the last variety often beautified by a metalic varnish covering the lower half of the last whorl.

The animal, with one exception, is the most beautiful in coloring, of any of our Helices. When not much extended, the large, flat granulations of a bright, burnt sienna color, studding the superior and anterior surface, sometimes clouded with a patch of burnt amber, with its dark-colored mantle profusely flecked with white, give this animal a pleasing variety of warm colors, not often met with in this group of Mollusks.

2. HELIX INFUMATA, Gould.

South from Humboldt Bay to San Pablo Bay.

This rare species might, but for the rugose and pileous epidermis and more depressed form, readily be confounded with the preceding. The animal, however, is even more ornate. This species gives place on the south side of the Bay of San Francisco to the following:—

3. Helix arrosa, Gould.

This species has been traced south as far as Santa Cruz, on the Bay of Monterey. In size it is nearly or quite equal to either of those previously named, and is found varying in color, from a uniform pale lemon, without a band, to a sepia, mixed with fine veins of yellow, with a dark amber band cutting the body whorl. The succession of these species from North to South, in the order which they are given here, will be noted, and we have yet to learn the slightest interference with each other's territorial rights.

4. Helix Townsendiana, Lea.

Oregon. Locality, so far as known, quite limited.

5. Helix Nickliniana, Lea.

Coast Range from Klamath Co. to Santa Cruz.

This species offers several varieties to the collector, the principal of which are included in the following:—

a. Of double normal size, with open umbilicus.

b. Of normal size, umbilicus open.

c. Without band, umbilicus closed, not malleated; lip broadly expanded.

d. Surface finely granulate, granules arranged in zig-zag patterns; umbilicus nearly closed; lip white and heavy.

The two first named varieties are found in Santa Cruz Co.; var. *c.* in Klamath Co.; var. *d.* in Alvarado, Alamedo Co. This last, under less favorable circumstances than in marshy places, is less solid in development, and equals *H. redemita,* W. G. Binney.

6. H. Californiensis, Lea.

This species is of rare occurrence, a few specimens only having been obtained near San Francisco, and by Mr. Voy, in Klamath Co. No opportunity for an examination of the animal has yet occurred. It is quite distinct in form from *H. Nickliniana.* Reeve gives this shell in Con. Icon., No. 660, under the name of *H. vincta,* Valen, and in the following figure gives *H. Nickliniana*, Lea, under the name of *H. Californiensis*

7. H. Dupetithouarsii, Desh.

This species has not been met with along the coast north of Monterey, and, excepting a few *doubtful,* dead specimens from Calavaras Co., seems to be confined to Cypress Point, situated on the Bay of Monterey. Notwithstanding statements that it has been found in Oregon, and that it has received the name of *Oregonensis,* given by Mr. Lea, we are compelled to limit the species to the localities named above.

8. H. TRASKII, Newc.

This shell, nearly allied to the preceding, extends from Los Angelos, north, to Fort Tejon, a distance of about 140 miles. The distinctive characters are, the finely impressed and crowded transverse striæ, its lighter coloration, more channelled suture, and differences in the animal.

9. H. HILLEBRANDI, Newc.

This interesting shell has been found in Tuolumne Co. by Mr. Voy, and in Mariposa Co. by Mr. Gabb. In recent specimens, in fine condition, the epidermis covers the shell so as to prevent the bands from being seen. The short, rigid hairs on the surface extend through this epidermis, so as to leave cicatrices on the shell, when stripped of this covering.

10. H. EXARATA, Pfr.

Upon travelling north from the locality of *H. Dupetithouarsii*, we pass into Santa Cruz Co., where this species first appears and is found in considerable abundance. We occasionally meet with a variety of a creamy-white color, without bands.

11. H. RAMENTOSA, Gould.

This species is met with on the Coast Range of Mountains from the Mission of San José to Oakland, and is found at Mare Island, and at the Geyser's or Boiling Springs, in Napa Co. It includes the variety described by Dr. Pfeiffer as *H. reticulata*. Dr. Gould's description dates Oct., 1856, Dr. Pfeiffer's in 1857. There are several varieties of this species, the typical specimens having more solidity than those from the Geyser's and Mare Island; the latter having the columella of a flesh color, and the whole shell of a light corneous texture. An extreme variety in *size*, of which but a single specimen has been found, measures in greatest diameter 1·30 inch, while the smallest adult in my collection measures but ·70. The table of measurements attached to this communication, giving the extremes of different species, will be of service in indicating the range of variation *in size*.

12. H. BRIDGESII, Newc.

This species has been found only in the neighborhood of San Pablo, in Contra Costa Co. It has the *sculpture* of *ramentosa*, but finer, and the *form* of *Nickliniana*, but with a more oblique aperture and more pointed and elevated spire. It is not so widely separated from either of the two as to claim first rank as a distinct species, but will, under the rules of Prof. C. B. Adams, claim a second place in his proposed system of classification.

13. H. AYRESIANA, Newc.

This well characterized species has been found only at Nootka Sound, and forms, with the two following species, a well marked section of the genus.

14. H. CREBRISTRIATA, Newc.

San Clementine Island, off Santa Barbara.

15. H. INTERCISA, W. G. Binney.

Oregon. W. G. Binney.

I am aware that Mr. Binney claims that these two species are identical. If this be correct there certainly is an error in locality to be corrected. No land shell inhabiting Oregon has been found so far south as Santa Barbara, and, in this respect, their zoological provinces are as distinct and well-marked as are those of the two temperate zones.

16. H. TUDICULATA, Binney.

The only authentic localities for this species are the neighborhood of San Diego, Calevaras Co., (Voy,) and Copperopolis. This last is a small variety, with the peritreme tinged with pink, and much more faintly malleated than the typical specimens. It is reported from Oregon, by Dr. Cooper; also from Benecia. In the latter case the *H. ramentosa* is probably referred to, in the former we are in possession of no data by which we can explain the mistake.

17. A. KELLETTII, Forbes.

This species, found abundantly by Dr. Cooper on Santa Barbara Island, has, probably, a more southern habitat as well. Specimens, kindly forwarded to me by Mr. Cuming, differ from any of the varieties from Santa Barbara by their small size, less polished surface and stronger striæ.

Dr. Cooper, of the Cal. Geological Survey, collected at San Diego another variety (?) much more rounded in the whorls, with the aperture not oblique, but roundly lunar.

A variety of this last in my Cabinet has, on a white ground, two broad and nine narrow reddish-brown bands on the body whorl. It may claim a position as a distinct species from its different aperture and outline.

18. H. TRYONI, Newc.

Santa Barbara Island, (Cooper.)

19. H. Areolata, Sowb.

Margarita Bay and Cerros Island, (Veatch.)

This is from Lower California, the small variety from Margarita.

20. H. pandora, Forbes.

Margarita Bay, Lower California.

The locality of Mr. Reeve for this species is not quite so definite as was intended. "Central America, near the Straits of Juan del Fuaco;" the nearest approach of the latter (Straits of Fuca) to the former being over two thousand miles.

20*a*. H. levis, Pfr.

"Banks of the Columbia River, California," (Reeve.)

This locality is almost as obscure as the former, as the Columbia River does not reach within some hundreds of miles, the boundary of California. From its aspect, this species belongs to the tropics. It certainly is not a California or Oregon species.

21. H. rufocincta, Newc.

Santa Catalina Island, (Baily.)

This, with the two following species, have more of the Southern than Northern type of Helices.

22. H. Gabbii, Newc.

San Clementine Island, (Cooper.)

23. H. facta, Newc.

Santa Barbara Island, (Cooper.)

24. H. Carpenteri, Newc.

Valley of the San Joaquin.

This species, distinguished, like the two following, by a circular aperture and large umbilicus, forms, with them, a Cyclostomoid group, of much interest to the American Naturalist.

25. H. Rowelli, Newc.

Arizona, (Frick.)

26. H. Cooperi, W. G. Binney.

Washington Co., Utah, (Bland.)

"East side of Rocky Mountains, lat. 47° 30″, (Cooper.)

27. H. DEVIA, Gould.

H. Baskervillii, Pfr.

Banks of the Columbia, Western Oregon, (Abernethy.) Vancouver's Island, (Pfeiffer.)

This, with the following three species, are often dentated, the last two always. I have a specimen of the *devia,* which deviates from the rule, as it is a full-grown adult shell without a tooth. The animal is a light amber-color with fine granulations, base of foot dirty white, mantle light ash-color, pulsations of the heart, as seen through the shell, 37 in a minute.

28. H. COLUMBIANA, Lea.

In this species it is customary to include *H. labiata,* Gould. Its range, as far as traced, is from Fort Simpson, north, lat. 54° 40′, through British Columbia, Washington Territory, Oregon, and south to Santa Cruz, in California, in 37° 20′. With one exception, this has the widest range of any of our Helices of the West Coast, ranging through over 17° of latitude.

The varieties are numerous, and may be classified to suit the views of naturalists. The following I have found convenient:—

1st. *Smooth, polished.*

a. umbilicate	major.	minor.
b. umbilicus closed	"	"
c. dentate	"	"

2d. *hirsute.*

a. umbilicate	"	"
b. umbilicus closed	"	"
c. dentate	"	"

This will give us at a glance 12 varieties, varying in some detail of character; and if we wish to refine upon the matter, we may add another section of Labiata, which will add six more to our list.

I have not been able to detect the eyes "at the base of the tentacles," but have always found them as in others of the genus.

29. H. LORICATA, Gould.

Sacramento River, (Gould.) Oakland, (Newcomb.) Klamath Co., (Voy.)

The characters in the different localities hold good, although the difference in size is well-marked, those from the last named locality more than doubling the size of those found in the vicinity of San Francisco.

30. H. GERMANA, Gould.

Oregon, (Expl. Exped.)

My collectors in Oregon have failed in finding this species, and I can add nothing to our previous knowledge concerning it.

31. H. MORMONUM, Pfr.

Mormon Island, California, (Newcomb,) type. Sonora, (Frick.) Klamath Co., (Voy). Mount Shasta, (Brewer.)

This species is generally much more depresed than the type, is less solid, and of a lighter shade of corneous. In specimens from the northern part of the State the color *below* is light horn, and *above*, the broad brown band is more or less interrupted by transverse white streaks.

32. H. NEWBERYANA, W. G. Binney.

Southern California.

This species, referred to *Macrocyclis* by Mr. Binney, is one of our most rare and choice species.

33. H. MULLANI, Bland.

St. Joseph's River, Washington Territory, (not Oregon.)

Dr. Cooper, who collected this species, makes the correction above.

34. H. VANCOUVERENSIS, Lea.

Sitka, (Newcomb.) Metlakahtlah, lat. 54° 10′, (Hepburn.) Oregon, (Authors.) California, south to Vera Cruz, (Newcomb.)

This species has the widest range in latitude of any of our Western Helices. I have received a specimen from Sitka, in lat. 56°, and collected the small variety which has been distributed erroneously as *H. sportella*, Gould, as far South as 37°, thus giving a range of 19°. How much farther to the North it may be found will possibly be determined by the Russo-American Telegraphic Survey, now in the field. The animal is of a uniform pearly white, with the upper tentacles slightly shaded, as long as the greater diameter of the shell, with two impressed lines upon each side of the centre, extending from between the tentacles backward; granulations rather large and flattened, terminating in a rounded or but slightly pointed extremity. This description is from the large typical variety from Oregon.

35. H. SPORTELLA, Gould.

Oregon, (Gould.) Shasta Co., California, (Voy.)

Quite a distinct species from the preceding in any of its varieties.

36. H. VOYANA, Newc.

Cañon Creek, Trinity Co., California, (Voy.)

37. H. STRIGOSA, (Gould.)

"Interior of Oregon," Gould.

38. H. CRONKHEITII, Newc.

Southern Oregon, (Gabb.) Northern California, (Voy.)

39. H. DURANTI, Newc.

Santa Barbara Island, (Dr. Cooper.)

40. H. WHITNEYI, Newc.

Lake Tahoe, (Dr. Cooper.)

41. H. BREWERI, Newc.

Lake Tahoe, (Dr. Cooper.) Mammoth Grove, Calavaros Co., (Master Willie Hillebrand.)

42. H. FULVA, Drap.

Lake Tahoe, (Dr. Cooper.)

43. H. CONSPECTA, Bld.

San Francisco, (Rowell.)

The six last named are minute species, one of which, *H. fulva*, Drap., (*chersina*, Say,) inhabits Europe and the Atlantic States, and was found by Dr. Cooper somewhat largely developed, on the boundary between California and Nevada. No tangible difference can be detected between the European, Eastern and Western American shells, except in size, which is a character of but secondary importance.

The following is an attempt at grouping the species, with reference to their affinities, rejecting those that I have not had an opportunity of examining:—

a. H. FIDELIS, INFUMATA, ARROSA.
b. " NICKLINIANA, CALIFORNIENSIS, TOWNSENDIANA.
c. " RAMENTOSA, BRIDGESII, EXARATA.
d. " AYRESIANA, INTERCISA, CREBRISTRIATA.
e. " DUPETITHOUARSI, TRASKI, HILLEBRANDI.
f. " DEVIA, COLUMBIANA, LORICATA.
g. " KELLETTII, TUDICULATA, and var. (?) of KELLETTII.
h. " FACTA, GABBII, RUFO-CINCTA.
i. " TRYONII, AREOLATA, PANDORA.
k. " CARPENTERII, ROWELLI, COOPERI.

l. H. VANCOUVERENSIS, SPORTELLA, VOYANA.
m. " CRONKHEITII, DURANTII, CONSPECTA.
n. " WHITNEYI, BREWERI, FULVA.
o. " Without affinities. NEWBERYANA and MORMONUM.

It is interesting to note the difference in measurement of the extremes in size of the larger species. The following table illustrates the variation in some few of them, in inches:—

	Large Diam.	Small Diam.	Elevation.
H. fidelis,	1·50	1·32	·90
	1·20	1·10	·675
H. arrosa,	1·45	1·175	1·00
	1·10	·90	·59
H. ramentosa,	1·30	1·00	·65
	·70	·65	·35
H. tudiculata,	1·40	1·15	·80
	·90	·75	·45
H. Nickliniana,	1·05	·95	·80
	·70	·65	·45
H. mormonum,	1·30	1·09	·575
	·90	·735	·35
H. Townsendiana,	1·275	1·09	·575
	·90	·735	·35

It will be understood that these are not such measurements as should be given in a description, but an average-sized specimen should be selected for that purpose. By obtaining the mean of the two, we shall arrive at about the ordinary size; *i. e.:* in *H. fidelis*, take the sum of the largest and smallest, selected from some hundreds of specimens,

$$\left.\begin{matrix}1\cdot50\\1\cdot20\end{matrix}\right\}=2\cdot70\div2=1\cdot34,$$

the fair average greater diameter.

It will be noticed that a number of species, usually credited to California, are omitted in this list. It has been my design to include *all* worthy of a place in an accurate catalogue, and to pass by those that are extra limital to the boundaries at the head of this article, or are synonyms of those mentioned.

In a future number, a catalogue, with their entire synonymy, may be given. To attempt it now would, perhaps, be premature, and would occupy too much space in your valuable Journal. W. N.

DESCRIPTION OF NEW SPECIES OF SHELLS.

BY JOHN G. ANTHONY.

1. Unio Peguensis, Anthony.—t. 25, f. 2.

Description.—Shell ovate-elliptical, smooth, inequilateral, moderately thick; epidermis olivaceous, with delicate capillary lines on the posterior slope, thickly crowded, which gives that portion of the shell a greenish tinge; lines of growth fine, crowded, elevated; beaks not elevated, very much eroded in all the specimens I have seen, but there is no appearance of any undulations at the tip; ligament long, straight, thin and yellow; cardinal teeth lamellar, thin, erect, and widely separate and divergent from the lateral teeth, which are long and somewhat curved; anterior cicatrix deep and distinct, posterior ones faint and confluent; nacre yellowish and silvery.

Habitat.—Pegu, British Burmah.

Cabinet of George W. Tryon, Jr. Mus. Comp. Zoology, Cambridge, Mass.

2. Helix cerinoidea, Anthony.—t. 25, f. 3.

Description.—Shell narrowly umbilicated, orbicularly convex, thin, of a waxy horn-color, closely and finely ribbed; whorls 7, convex, the last one inflated; umbilicus narrow, nearly covered by the columellar lip; aperture semi-circular; lip not reflected, margins connected by a thin white callus.

Habitat.—North Carolina.

Cabinet of George W. Tryon, Jr. Mus. Comp. Zool., Cambridge, Mass. Cabinet of Hugh Cuming, London.

Observations.—It may be compared with *H. Elliotti,* Redfield, which it resembles somewhat in color, but is less flattened, smaller, and has the umbilicus less open; its surface has a peculiarly shining, waxy appearance.

DESCRIPTION OF A NEW SPECIES OF PSEUDODON.

BY T. A. CONRAD.

P. ELLIPTICUM, Conrad.—t. 25, f. 1.

Description.—Elliptical, slightly ventricose, thin; cardinal tooth distinct in each valve; ventral margin regularly rounded; epidermis pale yellowish-olive, with a broad pale green ray with dark margins; umbonal slope hardly defined or obscurely angulated; beaks eroded.

Locality.—Cambodia.

Cabinets of Chas. M. Wheatley and of Geo. W. Tryon, Jr.

Observations.—This shell, received by Mr. Tryon from Mr. Wheatley under the name of *P.* (*Monocondylœa*) *Cumingii*, Lea, *var.*, is very different from that species: it is more elliptical, smoother, with a regularly convex basal margin, less inflated, and lighter in color. It also differs in the absence of the slight plications posteriorly, which are found on *Pseudodon Cumingii.*

Editor's Table.

REVIEWS.

I.—AMERICAN.

Proceedings of the Academy of Natural Sciences of Philadelphia. No. 2. April, May and June, 1865.

Diagnoses Specierum et Varietatum novarum Molluscorum, prope Sinum Pugetianum a Kennerlio Doctore, nuper decesso, collectorum; BY PHILIP P. CARPENTER.

Sphænia ovoidea.
Næra pectinata.
Kennerlia, (S. G. of Pandora.)
" *filosa.*
Psammobia rubroradiata, (Nutt, MSS.)
Macoma Yoldiformis.
" *expansa.*
Tellina (Angulus) modestus.
" " var. *obtusus.*
? Clementia subdiaphana.
*Psephis, N. G.**
Venus Kennerlyi.
Astarte (*? compressa* var.) *compacta.*
Lucina tenuisculpta.
Cryptodon sericatus.
Pythina rugifera.
Tellimya tumida.
Leda fossa, Baird.
Pecten Hindsii.
Tornatina eximia, Baird.
Cylichna (*? cylindracea* var.) *attonsa.*
Dentalium rectius.
Mopalia Kennerlyi.
? " *sinuata.*
? " *imporcata.*
Ischnochiton (Trachydermon) retiporosus.
" " *trifidus.*
" " *pseudodentiens.*
" " *flectens.*
Lepeta cæcoides.
Calliostoma variegatum.
Margarita tenuisculpta.
" *lirulata.*
" *inflata.*
Mesalia lacteola.
" (*? lacteola* var.) *subplanata.*
Rissoa compacta.
Drillia incisa.
" *cancellata.*
Mangelia levidens.
Bela excurvata.
Eulima micans,
Ocinebra interfossa.
? Chrysodomus rectirostris.

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* Type *Chione Lordi*, Baird. Zool. Proc., 1863, p. 69.

Observations on the Eocene Lignite Formation of the United States: BY T. A. CONRAD.

In this paper, our valued contributor discusses the extent of a formation which has been discovered to occur extensively in the United States, while possessing throughout its entire extent fossils, which, taken in connection with the position of the beds, and their appearance, prove them to belong to the Lignite Epoch of the Older Eocene.

Several species of Mollusca, received by Mr. Conrad from the Lignite of Shark River, Monmouth Co., New Jersey, prove to be identical with species of the London Clay and Plastic Clay of Europe, while one species, *Aturia ziczac*, Sowb., he has recognized not only in one of the Shark River forms, but also in a species from Astoria, in Oregon, formerly described by him in "Dana's Report on the Geology of the U. S. Expl. Exped.," as *Nautilus angustatus*. This, and other forms therein described, were at that time supposed to be Miocene, but Mr. Conrad was led to believe in their Eocene origin first through the discovery of the identity of this species in its far extended American and European localities. It will be seen by a paper herein published, on Mr. Gabb's "Report on the Cretaceous Mollusca of California," that Mr. Conrad has again recognized this species in *Aturia Mathewsonii*, Gabb, and that he refers a considerable portion of the species described by Mr. Gabb to the Older Eocene.

Some of the species from Shark River proved to be new and were described and figured in the 3d No. of this Journal.

Descriptions of three new Species of Exotic Uniones: BY ISAAC LEA.

Unio Wrightii, China. *U. rufofuscus*, ?
Unio tortuosus, China.

Of the last, Mr. Lea remarks, that "This remarkable *Unio* is the first which has been found possessing an *irregular plane of the margin and being inæquivalve.* When looking on the anterior end with the ligament above, the line of the opening of the valves curves to the right. The beak of the left valve is higher than that of the right, and projects anteriorly. The left valve is, therefore, larger than that of the right, and the weight differs—the left being 257 grains, and the right 242 grains. The very remarkable perpendicular striæ on the lateral teeth of this specimen, if always present in other individuals, will demand its being placed in the genus *Prisodon*, Schumacker=*Castalia*, Lam. These striæ are probably normal to the species. Before *Triquetra contorta*, from China, was described by me, none of us could have expected to see a member of the *Unionidæ* to be curved like *Arca tortuosa*, Lin.: but now we have a second member of the family totally unlike the other, except having a curved plane of the shell."

Descriptions of eight new Species of Unio of the United States: BY ISAAC LEA.

U. doliaris, Etowah River, Geo.
" *protensus*, N. Carolina.
" *punctatus*, Cany Fork, Tenn.
Tuscumbia, Ala.
" *amabilis*, Butler, Taylor Co., Geo.
" *Lyonii*, E. Tenn.
" *proprius*, Lafayette, Geo.
" *Cromwellii*, Albany, Dougherty Co., Geo.
" *marginis*, Blue Spgs., " "

Annals of the Lyceum of Natural History of New York. Vol. VIII.

Nos. 2 and 3. June—December, 1864.

Notes on Species of the Family Corbiculadæ, with Figures: BY TEMPLE PRIME.

Corbicula pexata,	China.
" *Primeana*, Morelet,	"
" *Mülleriana*,	"
" *Chemnitziana*,	"
" *lutea*, Morelet,	"
" *difficilis*,	Africa.
" *leviuscula*,	Cochin China.
" *Malaccana*, Desh.,	Malacca.
" *rhomboidea*,	"
" *Kirkii*,	Mozambique.
" *brunnea*,	Tasmania.
" *Leana*,	Japan.
" *Japonica*,	"
" *Lamarckiana*,	Cambodia.
" *Linneana*.	"
" *Blandiana*,	"
" *Sayana*,	Philippines.
" *Crosseana*,	"
" *venustula*,	Manilla.
" *striatella*, Desh.,	Pondicherry.
" *subradiata*,	Agra.
" *Agrensis*,	"
" *parvula*,	India.
" *purpurea*,	River Tigris.
" *Largillierti*, Desh.,	China.
" *sulcatina*, "	"

Corbicula minor,	New Holland.
" *inæquilateralis,*	Africa.
" *solidula,*	(?)
Batissa solidula,	(?)
Cyrena Bernardiiana,	New Caledonia.
" *proxima,*	Siam.
" *Siamica,*	"
" *ponderosa,*	Philippines.
" *Cyprinæformis,*	Australia.
" *regularis,*	(?)
Pisidium Nov-Zelandicum,	New Zealand.

This extended and excellent paper is illustrated by 39 beautifully executed wood-cuts, which, with the detailed descriptive and distinctive characters given, characterize amply, the new species of this very difficult family of Mollusca.

Nos. 4 and 5. May, 1865.

Description of a new Species of Mollusca, of the Genus Glauconome: BY TEMPLE PRIME.

G. oblonga, Singapore.

Notice of a Post-Pleiocene Deposit on Gardiner's Island, Suffolk Co., N. Y.: BY SANDERSON SMITH.

Catalogue of the Mollusca of Staten Island, N. Y.: BY J. W. HUBBARD, M.D., and SANDERSON SMITH.

One hundred and fifteen species are enumerated.

Proceedings of the California Academy of Natural Sciences. III. 1864—5.

Descriptions of new Marine Shells from the Coast of California: BY P. P. CARPENTER.

Part 1.

Calliostoma formosum.
" *splendens.*
Solariella peramabilis.
Margarita acuticosta.
Margarita salmonea.
Liotia fenestrata.
" *acuticosta.*
Amycla undata.

Part 2.

Leptonyx, sub. gen. (of *Collonia,* Gray).
" *sanguineus,* Linn.
Leptonyx, (*sanguineus,* var.,) *purpureus.*
" *bacula.*

Proceedings of the Essex Institute, Salem, Mass. IV. No. 6. July, 1865.

A Classification of Mollusca, based on the Principle of Cephalization: BY EDWARD S. MORSE.

An exceedingly interesting paper, from which we much regret that want of space prevents us from making more than a very few extracts.

Mr. Morse, as a preliminary, defines an animal as a sac, the contained mass of structure varied according to the class to which it belongs; thus we have a *vertebrate* sac, an *articulate* sac, etc. But, while the terms Vertebrata, Articulata, or Radiata properly express the plan of structure, the term Mollusca, he objects, does not possess so definative a meaning. He proposes instead, the name Saccata, suggested by Mr. Alpheus Hyatt, as expressing the *plan* of structure. "We may remark that the Mollusks as a type, present the sac features most completely, for nowhere do we find the various organs so essentially concealed, or possessing the power of retraction within a sac, as in the Mollusca."

"In the following considerations, all preconceived ideas regarding the relative positions of the dorso-ventral, and antero-posterior diameters of the animal must be laid aside, and the essential structure of the animal, if rightly understood, must be our guide. The gradual morphological changes of the contents of the sac, and all other relations, are based on the principle of Cephalization. . . .

. . . "Commencing with the Polyzoa, we have the sac closed, while the mouth and anus terminate close together at the posterior pole of the sac; the mouth occupying the extreme posterior position, and by a dorsal bend of the intestine upon itself, terminating dorsally. The nerve mass is found between the oral and anal openings. In this class the mouth and anus have the power of protrusion from the sac. In the three lower orders, Cyclostomata, Ctnostomata, and Cheilostomata, the polyzoon, when completely evaginated, presents no fold or inversion of the sac, while in the higher group Phylactolæmata, there is a partial and permanent inversion of the sac under like conditions.

"This latter group, combining the permanent inversion of the sac-walls with the lophophoric arms, is the first approach to the Brachiopoda. No organ corresponding to a heart has yet been discovered. In the Brachiopoda we have a permanent invagination of the sac, and the mouth, as in Terebratula, already occupies a position some distance from the posterior edges of the overlapping shells, and the brachial coils permanently occupy the space thus made.

"We have in this group a dorsal flexure of the intestine, and a tendency to terminate as in the Polyzoa. In Lingula it terminates posteriorly and at one side. By the permanent inversion of the sac, the mouth makes a great advance toward the anterior pole. In Terebratula, Waldheimia, and allied genera, where the sac is very short and swollen, and the brachial coils very large, the viscera are crushed to the front, and the intestine, which is short and simple, is nearly bent upon itself, though still occupying a median line. In Lingula, where we have a very long and flat sac, the intestine is long, and has ample room for convolutions, but the anus, instead of terminating in a line with the mouth, is thrown to one side, in consequence of this excessive flatness of the sac. The heart will be found on the outer bend of the intestine and actually on the ventral side; the nerve occupying its homological position.

"(The manner in which I view the Brachiopoda, if true, will entirely reverse the accepted poles of their structure. What has been considered as dorsal, is here regarded as ventral, and what has been considered as anterior, is here regarded as posterior. Further remarks on this will be made hereafter.)

"Thus far the balance of structure has been thrown to the posterior pole of the sac, and though we see a cephalization, or concentration of the muscular system and viscera, toward the anterior pole in Brachiopoda, yet that pole being essentially closed, we have no function manifested at that end, except the degradational one of adhesion. In the Tunicata we have, through continued cephalization, the mouth thrown to the bottom of the sac, or nearer the anterior end, and now the anus terminates behind the mouth, and posteriorly.

"The heart has also followed the intestine in its rotation, and becomes anterior, and partially dorsal. The nerve mass is still posterior, and occupies a position between the two openings, as in Polyzoa.

"We have commencing in this group, the Tunicata, that erratic bending of intestine, and varied position in its anal termination, that is witnessed higher up in the scale, and though apparently governed by no law, we can yet trace the progressive movements toward a normal condition, by comparing Appendicularia, one of the lowest forms of the Tunicates, and representing the larval condition of their class. In this form the intestine has a ventral flexure, and terminates on the ventral side. In Pyrosoma it makes an abrupt bend toward the anterior dorsal region, and terminates anteriorly. In Salpa it terminates dorsally, on a line with the mouth, though still anteriorly. In Botryllus it creeps up, and terminates nearer the posterior pole of sac, though still dorsally. We have in this genus, and other compound Ascidians, the excurrent orifices of several individuals coalescing, forming a common cloaca for a community. The dorsal flexture is distinctly seen in Clavellina borealis. In these three classes, namely, Polyzoa, Brachiopoda, and Tunicata, the sac is essentially closed at the anterior end, and consequently the mouth opens toward the posterior end, and, with few exceptions, all are attached by the anterior end.

"This makes a natural division, corresponding to the Molluscoidea of Milne-Edwards, the Anthoid Mollusks of Dana, and a portion of the neural division of Huxley. In the Lamellibranchiata we have the sac opening anteriorly, and the mouth permanently occupying the anterior region, though in the lower forms pointing posteriorly, and in all cases the tentacular lobes pointing in that direction, and the mouth bent downward (ventrally), and partially obstructed by the anterior adductor, or by the undivided mantle. The gradual enlargement of the anterior opening is clearly seen, where in the Gastrochænidæ, we have first a minute orifice, for the passage of an immature foot, or metapodium; this opening gradually enlarging in different genera, until in the Unionidæ we have the sac almost completely separated, except dorsally. It will be noticed that the anterior opening is also ventral, or nearly so in the lower forms. In Gasteropoda the posterior end of the sac becomes essentially closed, and the ambient fluid now finds access to the gills through the anterior (though partially ventral) portion of sac, while with Cephalopoda the opening is all anterior. Thus far we have traced the gradual cephalization of the contents of the sac, and of the sac itself. . . . In the lowest class all the display of structure, with the oral and anal openings, lies at the posterior pole of sac. In this highest class, all this display of structure lies at the anterior pole. Advancing from the Polyzoa, by the gradual advance of the mouth, the posterior pole becomes less prominent. Even when the sac opens anteriorly, as in the Lamellibranchiata, the posterior end of sac remains open, and the mouth, partially inclined that way, receives its food from that end; the food being conducted to the mouth by ciliary motion as in the three lower classes. The nature of their food is also identical, being of an infusorial character, and as such it is obvious that masticating organs, or biting plates, such as we find in the two higher classes, are not needed.

"So long, also, as the posterior end of the sac remains open, the anus terminates at that end; when this opening becomes closed, as in the higher classes, the anus seeks an outlet through the anterior opening, and the mouth, that before received its food from the posterior end of the sac, and by ciliary motion, now distinctly points the opposite way, and is furnished with the proper organs to procure food, the nature of which requires separation and trituration."

Mr. Morse remarks, also, on the various regions of attachment in the Classes:—

"1st. Polyzoa: dorsal attachment.
2d. Brachiopoda: dorsal and anterior attachment.
3d. Tunicata: anterior.
4th. Lamellibranchiata: anterior and ventral attachment.
5th. Gasteropods: ventral and posterior attachment."
6th. Cephalopods: free.

The following remarks are made on the mouth and foot:—

"In the Lamellibranchs the foot is a simple muscular organ, developed from the ventral surface and protruding anteriorly. It is simply an organ of locomotion, in the lower forms not even performing this function. The oral opening is a simple slit, without the power of seizing or triturating its food.

"In the Gasteropods the foot is more specialized, and as an organ of locomotion far superior to that of the Lamellibranchiates, having oftentimes three well characterized regions, called by Huxley, the pro- meso- and metapodium, these regions oftentimes supporting certain processes, *e.g.*, cirri, opercula. The foot not only performs locomotion, but in many cases has the power of seizing and retaining its prey (*e.g.*, Natica). The mouth has an apparatus for biting and triturating its food, being furnished with an upper jaw, or buccal plate, and a tongue, armed with silicious particles. In the Cephalopoda the foot is so far differentiated as to be separated into prehensile arms furnished with rows of suckers, or hooks. These arms surround the head, and are thrown directly forward. They are capable not only of locomotion, but of seizing their prey, and performing also movements of aggressive action. In the higher forms of Cephalopods, the function of locomotion is delegated to other organs, while the arms subserve the uses of the head alone, and the mouth, furnished with two powerful mandibles opposed vertically, forcibly reminds us of a parrot's beak, or that of certain other vertebrates. Thus we have cephalic power manifested in the mechanical action of the foot.

"1st. Lamellibranchs—Locomotion.
"2d. Gasteropods—Locomotion, Prehension.
"3d. Cephalopods—Locomotion, Prehension, and Aggression.

"According to the principle of Cephalization, cephalic power is manifested either as a mechanical, sensorial, or pyschical force. Thus the Cephalopods possess, in the greatest measure, all three; while Gasteropods, not indicating, to any great extent, aggressive action, may be said to manifest but little psychical power; and the Lamellibranchiates manifest essentially only mechanical action."

We cannot pause to do justice to all parts of this paper, and reluctantly omit the author's remarks on the polarity of the Mollusca, and comparison in this respect, and the relations of its classes, with those of the other sub-kingdoms of animal life.

The following definition is given of the Saccata, with a synopsis of the classes:—

"SACCATA.

(1) *Animals of a varied form, without a radiate structure and without articulations.*

(2) *Stomach and viscera enclosed by a fleshy sac, which may be closed or open, at either one or both ends.*

(3) *Principal nerve masses, consisting of ganglia, which are adjacent to, or surround the æsophagus.*

(4) *Intestine bending inward, or having an outward flexure.*

(5) *Heart on the outer bend of intestine.*

SACCATA.	HOLOZOIC, OR TYPIC. *Mouth opens anteriorly.*	Sac open at anterior end.	CEPHALOPODA. GASTEROPODA.
		Sac opens at both ends.	LAMELLIBRANCHIATA.
	PHYTOZOIC, OR HEMITYPIC. *Mouth opens posteriorly.*	Sac open at posterior end.	TUNICATA.
		Sac closed.	BRACHIOPODA. POLYZOA."

Geological Survey of California. Palæontology. Vol. I.

Carboniferous and Jurassic Fossils: BY F. B. MEEK.

Triassic and Cretaceous Fossils: BY W. M. GABB.

(Published by authority of the Legislature of California. 4to, pp. xx., and 243, with 32 plates. 1864.)

This volume is alike creditable to the State which has authorized its publication, and to the authors, artists and printers engaged in its production. It is the most beautiful specimen of typography and engraving that we have ever seen in an American scientific work. The plates, executed from drawings by the respective authors, are truly magnificent.

The following are the contents (conchological) of the volume:—

Preface: BY J. D. WHITNEY, State Geologist.

Description of the Carboniferous Fossils: BY F. B. MEEK.

Seven species are described, three of them new.

Description of the Triassic Fossils of California and the adjacent Territories: BY W. M. GABB.

Of twenty-eight species described, twenty-four are new. We have also a new genus, *Rynchopterus,* nearly allied to *Avicula.*

Description of the Jurassic Fossils: BY F. B. MEEK.

Fifteen species, all of them new.

Description of the Cretaceous Fossils: BY W. M. GABB.

This paper includes the greater part of the volume. The Cretaceous was found by Mr. Gabb to be very largely developed in California, and this gentleman (who, by a long special study of this Formation and its fossils, has become the very highest American authority on the subject,) has worked up with much care the immense material placed at his disposal. Nearly two hundred and seventy-five species are described, of which all but about twenty-five are new. There are also several new genera:—

Haydenia, a form between *Buccinum* and *Volutharpa.*
Whitneya, somewhat resembling *Fasciolaria.*
Tessarolax, very closely allied to *Aporrhais.*
Lysis, general form like *Stomatia.*
Megistostoma, close to *Philine.*
Turnus, belonging to the *Teredidæ.*
Cyprinella, allied to *Cyprina.*
Eriphyla, allied to *Astarte* and *Gouldia.*
Anthonya, belonging to the family *Crassatellidæ.*
Meekia, apparently allied to *Tancredia,* Lycett.

Following the descriptions in Mr. Gabb's Report, is a valuable "Tabular Statement of the principal Localities of Cretaceous Fossils," twenty-seven in number.

Mr. Conrad has favored us with the following remarks on some of the species described by Mr. Gabb.

Observations on certain Eocene Fossils described as Cretaceous, by Mr. W. M. Gabb, in his Report, published in the "Palæontology of California:" BY T. A. CONRAD.

"Mr. Gabb has included the rock of Cañada de las Uvas, which contains *Venericardia planicosta* and *Aturia zic-zac,* in the Cretaceous series, but he has failed to show one Cretaceous fossil from that rock. I think the Eocene also occurs at San Diego, and all the Eocene forms of California that I have seen figured, are such as characterize the oldest members of the period, corresponding to the deposits of Shark River, N. J.; Piscataway and Fort Washington, Maryland; Pamunky

River, Virginia; the Santee beds of South Carolina, &c. I do not perceive from Mr. Gabb's Report, that there is any mixture of Cretaceous and Eocene species in California, such as we find at Wilmington, N. C., and in South Carolina. The remarkable and very characteristic fossil, *Radiolites gregaria*, abundant in California, has been omitted by Mr. Gabb in his Report. The Older Eocene, which occurs in both Upper and Lower California, is also found at Astoria, Oregon.

Mr. Gabb makes two divisions of his Cretaceous strata, A and B. The former is, doubtless, Cretaceous, and the latter, I am sure, will prove to be Older Eocene.

Fusus Californicus, Gabb, pl. 28, fig. 205. I do not recognize as my ? *Clavatula Californica* (*Leihorinus Californicus*, Con.) It does not come from the same locality as the latter, and is striated and ribbed on the spire, in which characters my species is wanting.

Volutilithes Navarroensis, pl. 19, fig. 56, belongs to my genus *Rostellites*, which is allied to *Fasciolaria*, the columellar plaits being very oblique. It is probably identical with *R. Texana*. The apparent dilatation of the labrum in the specimen figured in the Mexican Boundary Survey, is owing to its having been distorted by pressure. (Cretaceous.)

Fusus Rémondii, pl. 18, fig. 36, is a species of *Perissolax*, allied to *P. penita*, (*Pyrula*,) Conrad. (Eocene.)

Perissolax brevirostris is not a member of the genus, to which it is somewhat doubtfully referred by Mr. Gabb.

Naticina obliqua, pl. 21, fig. 112, is an Eocene fossil.

Amauropsis alveata is a species of *Globularia*, Swainson, and occurs, I think, in the Older Eocene limestone of South Carolina, or a species very near to it. The genus is well represented in the Paris Eocene. Mr. Gabb evidently confounds two species, as he remarks that the specimens in division B (Eocene) are smooth, and those in division A (Cretaceous) are striated. A comparison of his figures, pl. 19, fig. 9 (Eocene), and pl. 21, fig. 111, (Cretaceous), is sufficient to show a wide specific difference.

Turritella uvasana, Con., pl. 21, fig. 92, is an Eocene species.

Ficus mamillatus, pl. 32, fig. 276, is probably *Sycotypus modestus*, Conrad, an Eocene fossil from Oregon.

Perissolax is a genus nearly related to *Sycotypus*, Browne, and two other species should be referred to it, *Fusus Hornii*, and *Fusus Cooperii*, Gabb, pl. 28, figs. 206, 207. The London Clay of Bognor contains one species, *Pyrula Smithii*, Sowerby; the Paris Basin three species, *Pyrula nexilis, elegans* and *tricarinata;* Claiborne, Ala., one species, *Pyrula penita*, Conrad. This genus is peculiar to the Eocene formation, and may be distinguished from *Pyrula* by its elongate form, the canal being longer and narrower than in the allied genus, and by its nodes and ribs.

Chemnitzia Spillmani, pl. 10. fig. 70, is very distinct from the species I described under that name. The outline of the two species is very different, the *Spillmani* rapidly decreasing in size from the aperture, and Mr. Gabb's shell very gradually. His shell is smooth on the under surface; the *Spillmani* is slightly convex on the base, with 5 or 6 impressed revolving lines and the ribs crenulated or subnodose.

Aturia Mathewsonii is *Aturia zic-zac*, or, if it should be distinct, it would be the same as *A. angustata*, Conrad. The genus is peculiar to the Tertiary, and the *zic-zac* never found above the London Clay or Older Eocene in England and the Paris Basin. It is found in Older Eocene rock at Cañada de las Uvas, in company with a *Venericardia*, very similar to *V. planicosta* (*Cardita Hornii*, Gabb.) It is probably identical with the *planicosta*, and seems to belong to the var. *regia*, of the Older Eocene of Maryland, which varies from *planicosta* only in the ribs being distinctly separated at base.

Dosinia elevata, Gabb, pl. 20, fig. 252, is *Dosiniopsis alta*, Conrad. which is very near to, if not identical with *Dosiniopsis Meekii*, Conrad. The specimen I described as *D. alta*, was so very imperfect, that I should not have suspected its identity with *D. Meekii*, had it not been better represented in Mr. Gabb's figure. This shell is peculiar to the Older Eocene.

Dosinia Uvasana, pl. 30, fig. 248, is *Dione ovata*, (*Cytherea*,) Rogers, found in the Older Eocene of Virginia. *Cytherea pyga*, Conrad, is probably a variety of this species.

Meekia sella, pl. 25, fig. 179, is probably *Cyprina bisecta*, Conrad. (Eocene.)

M. navis, fig. 180, is a species of *Yoldia*.

Mactra Ashburnerii, fig. 127, is probably *M. albaria*, Conrad, (Eocene.) Two species have been confounded, one Cretaceous, and the other Eocene. One he describes as having "regular, nearly uniform, rounded concentric ribs," and another as having only fine lines of growth. The former is probably a Cretaceous species, whilst the latter corresponds with the Eocene *albaria*.

Nucula truncata, pl. 26, fig. 184. Two species are evidently confounded under this name. Mr. Gabb should have figured a specimen from each division, as he has done in *Amauropsis alveata*.

Leda protexta(?), Gabb, pl. 26, fig. 185. There are two species here united, neither of which is the *protexta*—one Eocene, the other Cretaceous. A figure from a specimen of each division is very desirable."

II.—FOREIGN.

BRITISH.

Annals and Magazine of Natural History. No. 89. May, 1865.

Diagnoses of new Forms of Mollusca from the West Coast of North America, first collected by Col. E. Jewett, (concluded): BY PHILIP P. CARPENTER, B.A., PH.D.

The following minute species are described, all of them from Sta Barbara Island and vicinity, California.

- *Mangelia variegata.*
- " *angulata.*
- *Myurella simplex.*
- *Odostomia inflata.*
- *Chemnitzia crebrifilata.*
- " (*torquata*, var.?) *stylina.*
- " *Virgo.*
- *Dunkeria laminata.*
- *Eulima Thersites.*
- *Opalia bullata.*
- *Cerithiopsis purpurea.*
- " *fortior.*
- *Marginella subtrigona.*
- " *regularis.*
- *Amycla tuberosa.*
- *?Anachis penicillata.*
- *Siphonalia fuscotincta.*

Diagnoses of new Forms of Mollusca collected by Col. E. Jewett on the West Tropical Shores of North America: BY PHILIP P. CARPENTER, B.A., PH.D.

- *Rossoina expansa*, Mazatlan.
- *Mangelia hamata*, Panama.
- *Mangelia cerea*, Panama.
- *Chemnitzia cælata.*

Proceedings of the Zoological Society of London. 1864. Part 1. January—March.

Descriptions of new Species of Shells, chiefly from Australia, in the Collection of Mr. Angas: BY ARTHUR ADAMS and GEORGE FRENCH ANGAS.

- *Triton Waterhousei,*
- " *Strangei.*
- *Neritula (Callomphala) lucida.*
- *Catillus ornatus.*
- *Neritella (Dostia) Lifuensis.*
- *Gibbula nitida.*
- " *picturata.*
- *Thalotia mundula.*
- *Trochocochlea excavata.*
- *Canthiridus decoratus.*
- *Cylindrobulla Fischeri.*
- *Helix (Corasia) Anadyomene.*
- *Buliminus (Chondrula) lepidula.*
- *Succinea strigillata.*
- *Leptopoma Dohrni.*
- *Physa inflata.*
- *Thecalia macrotheca.*
- *Unio (Alasmodon) Evansi.*

On a supposed new Species of the Genus Helix, from North-Eastern Australia: BY JAMES C. COX, M. D.

Helix Forbesii.

Observations on the Geographical Distribution of the Species of Voluta and Cymbium in the Australian Seas: BY GEORGE FRENCH ANGAS.

Mr. Angas writes, that no less than twenty-eight or twenty-nine of the seventy species of the genus *Voluta*, already known to us, and some half-dozen of the allied genus *Cymbium* have their habitat in the Australian waters." He includes, as belonging to the same geographical province, New Caledonia, New Zealand, and the adjacent islands. The following are the species enumerated, with notes on localities, &c.:—

Voluta (*Scapha*) *fusiformis*, Sw. *V.* (*S.*) *rutila*, Brod. *V.* (*S.*) *piperita*, Sowb. *V.* (*S.*) *Deshayesii*, Reeve. *V.* (*S.*) *Norrisii*, Sowb. *V.* (*S.*) *nivosa*, Lam. *V.* (*S.*) *Maria-Emma*, Gray. *V.* (*S.*) *mamilla*, Gray. *V.* (*S.*) *Pacifica*, Solander. *V.* (*S.*) *gracilis*, Swn. *V.* (*S.*) *Sophia*, Gray. *V.* (*Volutella*) *flavicans*, Gmel. *V.* (*V.*) *papillosa*, Swains. *V.* (*V.*) *fulgetrum*, Brod. *V.* (*V.*) *Rossiniana*, Bernardi. *V.* (*Amoria*) *undulata*, Lam. *V.* (*A.*) *exoptanda*, Sowb. *V.* (*A.*) *volva*, Chemn. *V.* (*A.*) *reticulata*, Reeve. *V.* (*A.*) *Turneri*, Gray. *V.* (*A.*) *prætexta*, Reeve. *V.* (*A.*) *maculata*, Swn. *V.* (*A.*) *marmorata*, Swn. *V.* (*A.*) *zebra*, Leach. *V.* (*Lyria*) *mitræformis*, Lam. *V.* (*L.*) *nucleus*, Lam. *V.* (*L.*) *deliciosa*, Montr. *Melo Georginæ*, Gray. *M. umbilicatus*, Brod. *M. diadema*, Lam. *M. mucronatus*, Sowb. *M. Broderipii*, Gray. *M. Miltonis*, Gray.

List of the Shells collected by Captain Speke during his Second Journey through Central Africa: BY DR. H. DOHRN.

The only new species among twenty-seven species enumerated, is

Achatina Spekei.

Remarks on a Species of Shell belonging to the Family Dentaliidæ: BY W. BAIRD; *with Notes on their Use by the Natives of Vancouver's Island and British Columbia:* BY J. K. LORD.

Part 2. April—June.

Descriptions of new Genera and Species of Chitonidæ from the Australian Seas, in the collection of George French Angas: BY HENRY ADAMS and G. F. ANGAS.

Lepidopleurus variegatus.
“ *speciosus.*
“ *liratus.*
Stenochiton, N. G.
“ *Juloides.*
Chætopleura conspersa.
Lorica Angasi.

Microplax, N. G.
“ *Grayi,*
Hanleya variabilis.
Acanthochites carinatus.
“ *costatus.*

On Urocyclus, a new Genus of Terrestrial Gasteropodous Mollusca from Africa: BY DR. J. E. GRAY.

U. Kirkii.

Descriptions of new Species of Mollusks of the Genera Registoma and Pupina: BY OTTO SEMPER.

R. ambiguum, Luzon.
Pupina difficilis, Palaos I.

Part 3. June—December.

Descriptions of two new Species of Australian Land Shells: BY JAMES C. COX, M. D.

Succinea Eucalypti.
Helix Macleayi.

Descriptions of four new Species of Australian Land Shells: BY JAMES C. COX, M. D.

Helix Mariæ.
“ *assimilans.*

Helix Wilcoxi.
“ *Clarencensis.*

Contributions towards a Monograph of the Pandoridæ: BY PHILIP P. CARPENTER.

Clidiophora, N. G.
“ *cristata,* Carp.
Cœlodon, N. G.
“ *elongatus,* Carp.

Kennerlia, N. G.
“ *filosa,* Carp.
“ *bicarinata,* Carp.

Descriptions and remarks on previously described species are also given. The two last species were also published in the Proc. Acad. Nat. Sciences, Philadelphia, and the Proc. California Acad. Nat. Sciences, San Francisco, respectively.

Descriptions of seven new Species of Land Shells, from the collection of H. Cuming, Esq.: BY DR. L. PFEIFFER.

Helix Peasiana, Timor.
“ *zonella*, I. Crete.
Clausilia glabella, I. Crete.
“ *extensa*, “
Clausilia tenuicostata, I. Crete.
“ *rudis*, “
“ *distans*, “

Descriptions of new Species of Land Shells from the Islands of the Central Pacific: BY WM. HARPER PEASE.

Helix obconica.
“ *normalis.*
“ *simillima.*
“ *fabrefacta.*
“ *ficta,*
“ *sculptilis.*
“ *retunsa.*
“ *depressiformis.*
“ *prostrata.*
Bulimus turgidus.
“ *argutus.*
“ *annectens.*
Partula producta.
“ *lignaria.*
“ *clara.*
Partula attenuata.
“ *planilabrum.*
“ *lugubris.*
“ *Garrettii.*
Lamellina lævis.
Tornatellina aperta.
“ *oblonga.*
“ *simplex.*
Helicina solida.
“ *corrugata.*
Realia producta.
“ *abbreviata.*
Hydrocena nitida.
“ *ovata.*
Cyclostoma biangulatum.
“ *parvum.*

The paper is followed by a list of species, distributed by Mr. Pease, under his MSS. names, which, on the authority of Mr. Cuming, are regarded as synonymous with previously described species. As several American conchologists have received these species, we reprint the list. (As Mr. P. P. Carpenter states, in a note to the paper: “It must be remembered that Mr. Pease may have reasons for regarding them as distinct, which do not appear on the face of the specimens.”)

HELIX FUSCATA, Pse.=NIGRITELLA, var.
“ NIGRITELLA, Pse.=TROCHIFORMIS.
“ LENTA and SCUTA, Pse.=SWAINSONI, var.
“ CONSIMILIS, Pse.=RADIELLA, Pfr.
“ VERTICILLATA, Pse.=BRUNEA, Ant.
VITRINA DEPRESSIFORMIS, Pse.=HELIX ALATA, Pfr.
SUCCINEA RUTELLA, Pse.=SEMISERICA, Gld.
“ OVATA and LABIATA, Pse.=PAPILLATA, Pfr.

Partula gracilis, Pse.=amabilis, Pfr.
“ fasciata, Pse.—ganymedis, Pfr.
“ megastoma, Pse.=callifera, Pfr.
“ stolida, Pse.=Vanikorensis, Quoy.
“ lineolata, Pse.=filosa, Pfr.
“ striolata, Pse.=decussatula, Pfr.
“ vexillum, Pse.=lineata, Less.
“ affinis, Pse.=rufa, Less.
“ “ “ var. dubia=varia, var.
“ crassa, Pse.(=perversa, Pse., nom. preoc.)=Otaheitana, Brug.
“ sinistrorsa and turricula, Pse.=rubescens, Rve.
“ radiata, Pse.=compressa, Pfr.
“ crassilabris and globosa, Pse.=hebe, Pfr.
“ suturalis, Pse. (nom. preoc.)=planilabrum, Pse.
“ virginea, Pse.=solidula, Pse. var.
“ variabilis, fusca, Pse.=navigatoria, Pfr.
“ cognata, Pse.=rosea, var.
“ labiata, imperforata, and ovalis, Pse.=dentifera, Pfr.
“ protea, citrina and vittata, Pse.=faba, var.
“ robusta, abbreviata, umbilicata, compacta, bilineata, recta and rustica, Pse.=auriculata, vars.
“ trilineata and alternata, Pse.=nodosa, Pfr.
“ simulans, Pse.=tæniata, Mörch, var.
“ elongata, Pse.=lineata, var.
Melampus cinctus, Pse.=zonatus, Mühl.
“ “fuscus, Phil.,” Pse.=Philippii, Kirst.
Cyclostoma viridans, Pse.=Blanfordia.
Hydrocæna robusta, Pse.=Realia Huaheinensis, Pfr.
“ elongata, Pse.=Realia scitula, Gld.
“ costata, Pse.=Realia Taheitensis.
Truncatella cylindrica, Pse. = Taheitia scalaris, Mich.
Helicina cincta, rubicunda and bella, Pse.=Maugeræ, Gray.
“ rufescens, Pse.=Rolvii, Pfr.
“ lenticulina, Pse.=solidula.
“ straminea, Pse.=pisum, Phil.
“ picta, Pse.=articulata, Pfr.
“ faba, discoidea and tenuiuscula, Pse.=albolabris, Jacq.
“ turbinella, subrufa, “? multicolor” and “? inconspicua,” Pse.=minuta, Sby.
“ “? vescoi, Dohrn,” Pse.=Hanlieinensis.

Remarks on the Species of Succinea inhabiting the Tahitian Archipelago, with Description of a new Species: BY WM. HARPER PEASE.

S. costulata, Pease.

FRENCH.

Journal de Conchyliologie. Vol. V. No. 3. July 1, 1865.

Note sur les faunes conchyliologiques des deux rivages de l'Isthme de Suez: BY P. FISCHER.

M. Fischer, referring to the fact that the rich molluscous faunas separated by the Isthmus of Panama, contain but four or five species in common, proceeds to examine the identity of the species of the Mediterranean and of the Red Sea, separated by the Isthmus of Suez. The result is the conviction that not a single species is held in common by the two seas. Lists of shells from the waters of both sides of the narrowest part of the Isthmus, collected with the special purpose of affording data for determining this important question, are given; and no less than twenty of the genera represented in the conchological fauna of the Red Sea, are wanting to that of the Mediterranean. As M. Fischer remarks, the completion of the Suez Canal will cause a commingling of the species of the two seas.

The errors of habitat, committed by former writers, are commented on.

Etudes sur la faune malacologique de Saint-Jean-de-Luz, de Dinan et quelques autres points du littoral océanien de la France: BY I. MABILE.

Two new species are described in this paper, the first, *Helix ignota*, being the *Helix intersecta* of Michaud, but not of Poiret. It has been confounded with *intersecta*, both by Dupuy and Moquin-Tandon. The second new species is *Clausilia Pauli.*

Quelques mots sur un arrangement des Mollusques pulmonés terrestres (Géophiles, Fer.) basé sur le système naturel: BY O. A. L. MÖRCH.

This is the first of what promises to be a very interesting series of papers. Various characters of the soft parts and shell are examined with reference to their relative importance in the separation of the species into genera and higher groups.

We can scarcely agree with Mr. Mörch, that the genus *Triodopsis*, Raf., is a good example of his rule, that "The number of teeth (of the aperture) is always in inverse ratio to the size of the shell, and increase in size as the shell diminishes." Confounding, evidently, *Mesodon*, *Xolotrema*, *Triodopsis* and *Dædalochila*, under the name of *Triodopsis*, he quotes *H. major* and *albolabris*, not toothed; *H. thyroides*, with a single tooth; *H. tridentata*, with three teeth, &c. The smaller shells (*Dædalochila*) with large teeth. Correcting his errors, we do not find that his position is good, regarding the shells cited and their allies; for in *Mesodon*, we find *albolabris* (sometimes), *profunda*, *Sayi*, *thyroides*, all large species, toothed; while the smaller ones are nearly all edentate, as *H. clausa*, *Mitchelliana*, *Pennsylvanica*, &c. Again, *Triodopsis* is characterized through *all* its species by the tridentate aperture, and some of them are as large or larger than the last cited species of *Mesodon*. As for his citation of the species of *Dædalochila* in this comparison, we think Mr. Mörch might as rationally compare *Arianta arbustorum* with *Isognomostoma* (*Triodopsis*) *personata*.

Additions au genre Scissurella: BY O. SEMPER.

S. Beyrichi.
S. Philippiana.
S. Koeneni.
S. Hoernesi.

Notice préliminaire sur la famille des Diplommatinacées: BY O. SEMPER.

This includes a catalogue of the species, with their localities.

Addition au Catalogue des Diplommatinacées: BY O. SEMPER.

Note sur les genres Julia et Prasina: BY O. SEMPER.

Description de Cônes nouveaux provenant de la collection Cuming: BY H. CROSSE.

C. Moussoni, Seychelles.
" *mirmillo*, ?
" *Carpenteri*, N. Guinea.
" *secutor*, ?
" *anabathrum*, ?
" *Lizardensis*, Lizard I.
" *Frauenfeldi*, Madagascar.
C. signifer, ?
" *Macei*, India.
" *circumsignatus*, ?
" *tribunus*, California.
" *archetypus*, ?
" *anaglypticus*, Antilles.

Diagnosis Castaliæ novæ: BY J. G. HIDALGO.

Castalia Crosseana, Equador.

Diagnosis Turbinellæ novæ: BY H. CROSSE.

Turbinella Hidalgoi, ?

Description de Coquilles fossiles des terrains Jurassiques (continued): BY M. C. MAYER.

Cardinia perovalis.
Candium Argovianum.
Ammonites militaris.
" *spinaries*, Quenst.
" *Nodotianus*, D'Orb., var.

Ammonites conjungens.
" *Toricellii*, Oppel.
" *hereticus.*
" *spinescens.*
" *Grœnackeri*, Mœsch.

De genre Mathilda: BY O. SEMPER.

This new genus embraces a few European species, principally fossil, previously referred to *Turritella, Eglisia* and *Scalaria.* Nine species are enumerated, of which the following are new:—

M. scabrella, Oligocene, Latdorf.
" *serrata*, " "
" *annulata*, " "
" *Brocchii*, Subapennin, Bologne.
" *gemmulata*, " Asti.

Addition à la monographie du genre Mathilda: BY O. SEMPER.

M. margaritula, Miocene, Lapugy, in Transylvania.
" *monilis*, " " "

GERMAN.

Monatsberichte der Koniglichen Preuss. Akademie der Wissenschaften zu Berlin. For 1864. Berlin, 1865.

Uber neue Cyclostomaceen und Helicinen aus dem Indischen Archipel: BY DR. VON MARTENS.

Opisthoporus Sumatranus, Sumatra.
Pterocyclos " "
Cyclotus latistrigus, W. Borneo.
" *fasciatus*, Celebes.
" *reticulatus*, Timor, &c.
" *ptychoraphe*, W. Borneo.
" *liratulus*, Moluccas.
" *bicarinatus*, "
" *carinulatus*, "
" *Gaymansi*, Sumatra.

Rhaphaulus ceramicus, Moluccas.
Omphalotropis bicarinata, "
Truncatella scalaroides. "
Diplommatina constricta, "
Paxillus rubicundus, W. Borneo.
Alycæus longituba, Sumatra.
Helicina sculpta, Timor.
" *suturalis*, Amboina.
" *Borneensis*, W. Borneo.

Diagnosen neuer Arten von Heliceen aus dem Indischen Archipel: BY DR. E. VON MARTENS.

Nanina sulfurata, Moluccas.
" *parcipila,* I. Adenare.
" *Riedelii,* Celebes.
" *amphidroma*, Sumatra.
" *Albersi,* Malacca.
" (*Orobia*) *hyalina,* W. Borneo.
" " *fulvocarnea,* Manado.
" " *aurea,*Sumatra.
*Hyalina Amboinensis,*Amboina.
Trochomorpha appropinquata, W. Borneo.
Trochomorpha lardea, Moluccas.
" *bicolor*, Sumatra and Borneo.
Helix quadrispira, Moluccas.
" *lutea,* "
" *endoptycha,* "
" *instricta.* "
" *aurita,* "
" *anozona,* "
Cochlostyla pubicepa, "
" *sulcocincta,* "
Clausilia Sumatrana, Sumatra.
" *Molluccensis,* Moluccas.

Diagnosen neuer Heliceen aus dem Ost. Asiatischen Archipel: BY DR. E. VON MARTENS.

Helix Friedeliana, Nagaski.
" *Sumatrana*, Sumatra.
" *conulus,* "
" *milium*, Amboina.
" *mendax*, Timor.
" *unguiculastra*, Amboina.
" *calcar*, Moluccas.
" *flaveola*, Celebes.
" *mersispira*, Moluccas.
" *biconvexa,* "
Bulimus leucoxanthus.
" *suspectus*, Timor.
" *Sumatranus*, Sumatra.
Buliminus spilozonus, Celebes and Timor.
Cionella Sumatrana, Sumatra.
Clausilia excurrens, "
Pupa ascendens, Amboina.
Streptaxis Johswichi, Siam.
Nanina rugata, Celebes.

Dr. von Martens has not been sufficiently careful in the selection of names for the above large number of new species. *Helix conulus* is preoccupied, we believe, for a Taheitian species, and Mr. E. S. Morse has used the name *milium* for a minute species inhabiting the State of Maine.

Die Fossilen Mollusken des Tertiær-Beckens von Wien: VON DR. MORIZ HORNES. (From K. K. geologischen Reischsanstalt, iv., 5, 6.) 11 Band. No. 5, 6. Bivalves. 4to. 1865.

The lithographic plates which illustrate the species described in this work, are some of the finest we have ever seen. The species are, many of them, noble shells, evidently in splendid preservation. Those figured in this volume are principally of the genera *Lucina*, *Cardita*, *Unio*, *Leda*, *Pectunculus*, *Arca*.

It is curious how the American types of *Unio* are represented among these European fossils, along with some belonging to the still-existing European forms. Pl. 37, figs. 6, 7, 8, 9, 10, exhibits shells which are eminently characteristic of existing American groups. The resemblance is wonderful.

Versuch einer Aufzahlung der Arten der Gattung Bithynia, Leach, und Nematura Bens, (mit Zusammenstellung der Arten der Gattung Vivipara, Lmk. in der Kaiserlichen Sammlung): BY GEORG RITTER VON FRAUENFELD.

Die Arten der Gattung Lythoglyphus Mhlf., Paludinella Pf., Assiminea Gray: By the same.

Vorlaufige Aufzahlung der Arten der Gattungen Hydrobia Htm. und Amnicola Gld. Hldm.: By the same.

We have received from the author, these three interesting papers, published in the "Proceedings of the Zool. Botan. Soc. of Vienna," 1862—3. The first contains the following new species:—

BITHYNIA.

B. Letochæ,	Estremadura.
" *Shuttleworthi,*	North China.
" *tristis,*	Kotschy, Schiraz.
" *proxima.*	
" *vertiginosa,*	New Holland.
" *Majewsky,*	Dalmatia, Croatia.
" *meridionalis,*	Spain, Calabria.
" *Schraderi.*	
" *umbratica,*	Estremadura.
" *perfecta,*	North America.
" *Africana,*	W. Africa.
" *Adamsii,*	Ganges.
" *ceranospatana,*	Bengal.

Descriptions of the following species of *Vivipara* are appended to the paper:—

V. Haldemaniana, Shuttlw.,	Black Creek, E. Florida.
" *Essingtonensis,* Shuttlew.,	Australia.
" *Warreana,* Shuttlew.	
" *lineolata,* Mouss.,	Palembang, Sumatra.
" *variata,* Frfld.,	Pondichery.
" *polita,* Frfld.,	South Africa.
" *Maheyana,* Grat. (?)	Malabar.
" *fallax,* Frfld.,	Madras.
" *formosula,* Frfld.,	Java.
" *polyzonata,* Frfld.,	India.

Bithynia perfecta, from Columbia, North America, we cannot identify from the description, but *Vivipara Haldemaniana* is, doubtless, the same as our common *V. lineata,* Val. *V. Warreana* is a good species.

In the second paper quoted, the following are referred to *Lithoglyphus:*—*L. integer*, Say; *L. subglobosus,* Say; *L. isogona,* Say; also:—

L. Cumingii, Nov. Sp., California.=(*Bith. seminalis*, Hinds.?)
L. fontinalis, Phil., Ohio.(=*Somat. integra*, Say.)
L. affinis, Nov. Sp., Kurdistan. *L. crassiuscula*, N. Sp., I. Opara.
L. pygmæus, “ Croatia. *L. deflexa*, “ “

The following new species of *Paludinella* are described:—

P. separabilis, Zgl. MSS.,	Algiers.
P. lata, Frfld.,	Kaschau.

There are also diagnoses of two new *Assimineæ*:—

A. fragilis, Quoy,	Tasmania.
A. sordida, Behn MSS.,	Nicobar.

The third paper quoted, contains the following new species:—

Hydrobia consociella,	Dalmatia.
“ *declinata*,	Croatia, Greece, &c.
“ *corrigata*,	Denmark.
“ *spelæa*,	New Zealand.
“ *Monroensis*,	Lake Monroe, Florida.
“ *Pleneri*,	Real Llejos.
“ *Reevei*,	New Zealand.
“ *Gunnii*,	Van Dieman's Land.
“ *Seemani*,	Mexico.
Amnicola miliaria, Parr.,	Dalmatia.
“ *orientalis*,	Bougie.
“ *exilis*,	Macedonia, Greece.
“ *Floridana*,	Florida.
“ *Diemense*,	Van Dieman's Land.
“ *confusa*,	France.
“ *Germari*, Stentz,	Zara.
“ *Schrökingeri*,	Massachusetts.

We cannot positively identify *A. Schrökingeri* with any of our species, (as descriptions without figures, in this genus, are nearly worthless,) still we doubt very much its being new to science.

Verhandlungen der Kaiserlich-Koniglichen Zoologisch-Botanischen Gesellschaft in Wien. III. 1864.

Horæ Dalmatinæ. Bericht über eine Reise nach der Ostküste des Adriatischen Meeres: BY DR. CAM. HELLER.

This paper contains a list of 240 species of Marine Mollusca, collected in the southern part of the Adriatic Sea. The particular localities, depths, &c., are given.

Zoological Miscellany: BY GEORG. RITTER VON FRAUENFELD.

Vivipara eximia,	China.
" *bullata,* (fossil,)	Austria.
Hydrobia elegantissima,	Siebenbürgen.
On Paludinella brevis.	
On Paludina concinna, Morr., (Swb.,) and its synonyms.	
Limax Schwabi.	

Systematisches Verzeichniss der im Kreise Cattaro (Süd-Dalmatien) mit Ausnahme der Biela-Gora und in einigen angrenzenden Theilen von Montenegro und türkisch Albanien vorkommenden Land-und Süsswasser-Mollusken: BY RUDOLF GRAF WALDERDORFF.

This paper contains a list of over a hundred species, with their localities, among which the following are new:—

Clausilia sulcosa, Mühlf., var. *elongata.*
" *Walderdorffii,* Kutsch., var. *lævigata.*
" *Goldi,* Kutsch., var. *sulcosula.*
" *proxima.*
" " var. *elongata.*
Pomatias turritus.
Melania Hollandri, Fer., var. *Montenegrina.*
Neritina fluviatilis, Linn., var. *expansa.*
" " " " *scutarensis.*
" " " " *fusca.*

Verzeichniss der Namen der fossilen und lebenden Arten der Gattung Paludina, Lam.: BY GEORG. RITTER VON FRAUENFELD.

This is an extensive and most valuable paper. It consists of an alphabetical list of the species belonging to the old Lamarckian genus *Paludina,* with reference to the new genera, and observations on synonymy, distinctive characters, &c. Nine hundred and thirty-three species are enumerated, and the list extends over one hundred pages.

We notice that the author refers those American species, of which Mr. Gill formed his genus *Somatogyrus,* to *Lithoglyphus;* he also, following some recent European malacologists, unites certain of their species with *Amnicola.* We very much doubt the correctness of this view, and prefer to consider these shells a separate genus.

Mr. Frauenfeld refers *Amnicola ciliata* and *corolla,* Gld., to *Hydrobia,* overlooking the difference between them and that genus. Dr. Stimpson* has established for these species, the genus *Potamopyrgus.*

Pomatiopsis Nickliniana, Lea, and *lapidaria*, Say, are referred to *Hydrobia. Bythinia seminalis,* Hinds, is placed as a synonym of *Fluminicola* (*Paludina*) *Nuttalliana,* Lea; and *nuclea,* Lea, is made a synonym of *virens,* Lea.

This work is indispensable to those who study the genera of which it treats, its completeness being such as to afford an exhaustive catalogue of species and bibliographical references.

Fauna der Land und Susswasser Mollusken Siebenburgens: BY E. A. BIELZ. 8vo, pp. 206. Hermannstadt, 1863.

This work contains detailed descriptions of the species found in the neighborhood of Hermannstadt, with very full remarks on localities, and on the varieties of the shells and habits of the animals. One hundred and fifty-three species and numerous varieties are described, preceded in each genus by a critical synopsis.

We have received from the author, along with the work above cited, a very full suite of these shells, and can testify to the very interesting local variation in the aspect of many of the widely distributed European species; many of the shells, however, are of very restricted distribution, and a number of them were first detected and described by Mr. Bielz; among them, the following, for the first time:—

Vitrina globosa. *Pisidium cuneatum.*

Revision der Nacktschnecken Siebenburgens: BY E. A. BIELZ. (Verhandlungen und Mittheilungen des Siebenburgischen Veriens fur Naturwissenchaften, 1863.)

Die Beschadigungen an den Schalen der Susswasser Muscheln und ihre Ursachen: BY E. A. BIELZ. (From the same.)

Ueber das Vorkommen der Pupa truncatella, Pfr., und einiger anderer seltener Mollusken im Kerzer Gebirge: BY E. A. BIELZ. (From the same.)

Verzeichniss der Mollusken und Conchylien Sammlung von E. Albert Bielz. 3d Edit., 38 pp., 8vo. Hermanstadt, 1865.

This catalogue of about five thousand species and varieties, is published for distribution to conchologists desiring to make exchanges. The duplicates in the collection are indicated by a star, and amount to about fifteen hundred species.

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* This Journal, Part 1, p. 53.

SCIENTIFIC INTELLIGENCE.

WE LEARN from the "Journal de Conchyliologie," that the magnificent Shell Cabinet of M. J. Dennison was sold at auction in April, in London, bringing £2,157.

The collection was remarkable for the extreme beauty and rarity of many of the specimens: among others, we notice *Cypræa princeps*, £40; *C. guttata*, £42; *Conus gloria-maris*, £42.

A RECENT ENUMERATION of the shells in the Cabinet of the Academy of Natural Sciences of Philadelphia, shows that it is the largest collection in the United States.

The following collections contain over 5,000 species each:—

Academy of Natural Sciences,	13,000
Dr. John C. Jay,	12,000
Dr. Wesley Newcomb, Oakland, Cal.,	10,000
George W. Tryon, Jr.,	8,000
Museum of Comparative Zoology, Cambridge, Mass.	
Smithsonian Institution, Washington, D. C.	
Isaac Lea, Philadelphia.	
Wagner Free Institute of Science, Philadelphia.	

We are not possessed of definite information regarding the size of the four last mentioned Cabinets, but have reason to believe that they each exceed the limit of 5,000 species.

WE REQUEST attention to the paper of Prof. Haldeman, published in this No. We will admit that we were wrong in stating that *Leptoxis* might be a *Lymnæan*, but we do not see that Prof. Haldeman has proved it (from the description) to be an *Anculosa;* why not as well *Somatogyrus?*

It is true that Rafinesque's MS. work, "Conchologia Ohiensis," confirms Prof. Haldeman's views, but we decidedly object to the use of any such means to identify obscure genera or species, when intended for the assertion of their priority over names subsequently published, and recognized by naturalists.

OBITUARY.

During the past few months, British naturalists have been compelled to mourn the loss, by death, of two distinguished men.

DR. SAMUEL P. WOODWARD, F. G. S., Assistant in the Geological Department of the British Museum, died at Herne Bay, July 11th, aged forty-three years.

Besides many smaller papers, published at different times in the periodicals, Dr. Woodward is the author of "A Manual of the Mollusca; or, a Rudimentary Treatise on Recent and Fossil Shells," published by Weale, London, 1851—6.

We believe we do no injustice to the authors of the many excellent general works on Conchology, in saying, that, for the combined purpose of elementary instruction, with that of a guide-book for the use of those who have not the leisure to pursue the study extensively, this work is without a rival. We scarcely can find in any publication of its size, so much varied information on the subject as this little volume contains; and we feel that in this "Manual," Dr. Woodward has raised a monument to his own fame, such as will not perish so long as there is a remembrance of the benefit which it has conferred on Conchological science, in rendering it popular.

HUGH CUMING. F. L. S., &c., died at London, August 10th, full of years as of honors. To the great personal exertion and liberality of this gentleman, conchologists throughout the world are much indebted for the collection and distribution of new species.

As most of our readers are aware, Mr. Cuming spent many years in personally collecting shells throughout the world, and with such success, that he has added over five thousand new species to Conchology, besides accumulating and diffusing a vast amount of accurate knowledge of their localities, distribution and habits.

These shells he has, with great liberality, placed at the disposition of naturalists of character, who desired to study them. They have been extensively distributed by a system of judicious exchanges, which at length made the Cumingian Collection the finest in the world. This splendid cabinet, embracing about thirty thousand species and varieties, has been bequeathed to the British Museum.

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PROSPECTUS OF SECOND VOLUME

OF THE

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Upon the commencement of our enterprise of establishing a periodical, exclusively devoted to the advancement of the interests of Malacological Science in the United States, we did not disguise from ourselves the many difficulties which would probably retard or interfere with a successful result. Although we now find that our apprehensions were by no means ill-founded and we are free to confess that a fore-knowledge of the various discouragements which have beset us, including a heavy pecuniary loss in its publication, would have prevented the inauguration of the Journal; we have found, on the other hand, much encouragement in the ready sympathy and advice of a number of gentlemen, who have willingly sacrificed much of their valuable time in promoting its interests.

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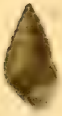
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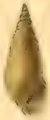
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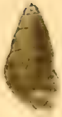
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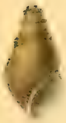
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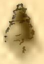
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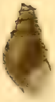
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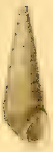
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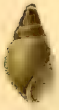
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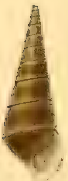
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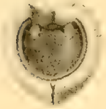
1.2. Goniobasis translucens. Anthony. 5.6.7. Goniobasis Catabaea, Haldeman.
3. „ interlineata. Anthony. 8. „ Haldemani. Tryon.
4. „ graminea. Haldeman. 9. Pleurocera Conradi. Tryon.

BOWEN & CO. LITH. & COL. PHILADA.



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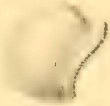

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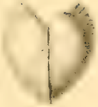

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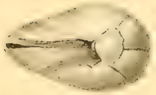

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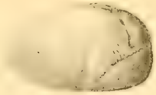

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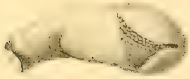

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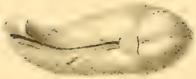

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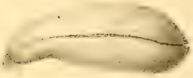
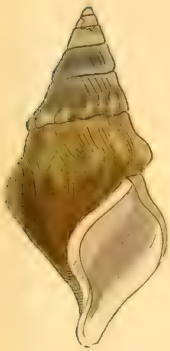


8.

Figs. 1.2.3. Navea Newcombii, Tryon.
" 4.5. Penitella parva, Tryon.
" 6.7.8. " curvata, Tryon.

BOWEN & CO. LITH. PHILADA



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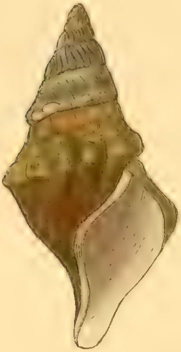

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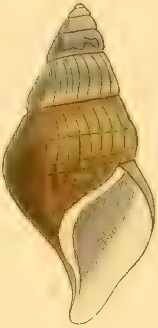

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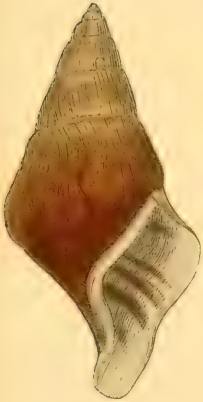

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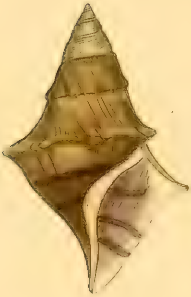

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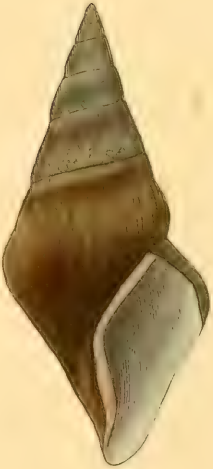
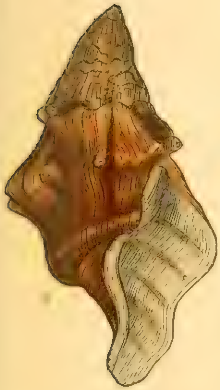


5.

Fig. 1. *Io fluvialis, Say.*
" 2. " *fluvialis, Say.*
" 3. " *inermis, Anth.*

Fig. 4. *Io verrucosa, Reeve.*
" 5. " *lurida, Anth.*
" 6. " *rhombica, Anth.*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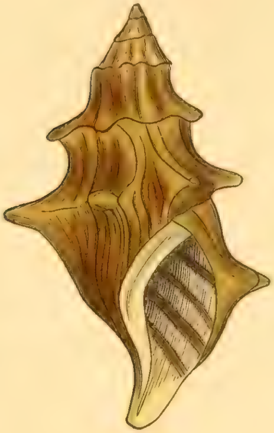
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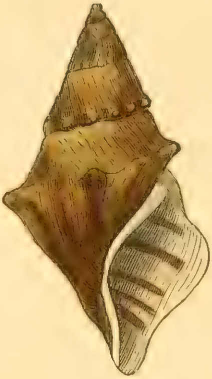
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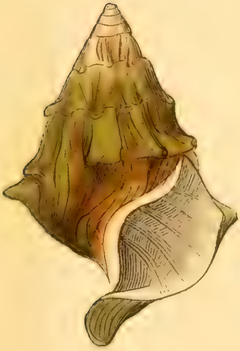
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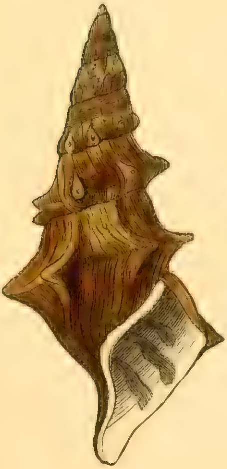
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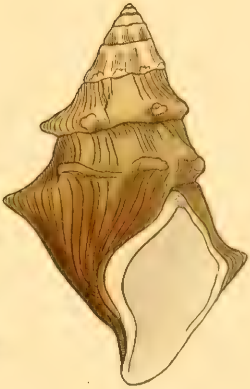
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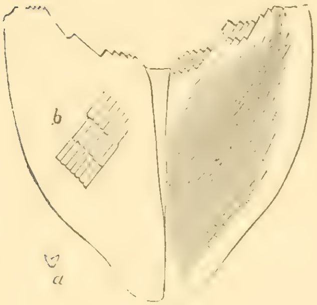
Fig. 7. *Io spinosa, Lea.*
" 8. " *gibbosa, Anth.*
" 9. " *recta, Anth.*

Fig. 10. *Io brevis, Anth.*
" 11. " *spirostoma, Anth.*
" 12. " *turrita, Anth.*



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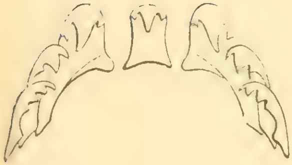

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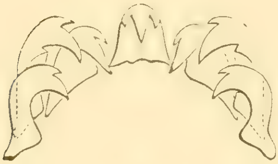

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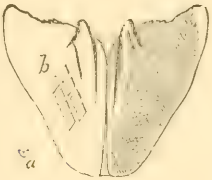


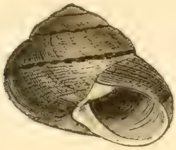
2.

Fig. 1. *Jaw of Cyclotus stramineus, Rv. magnified.*
a. Nat. size. b. Scales on the surface, magnified.

" 2. *Jaw of Megalomastoma cylindraceum, Chemn. magnified.*
a. Nat. size. b. Scales on the surface, magnified.

" 3. *Teeth. Megalomastoma Antillarum, Sowb.*

" 4. *Teeth. Cyclotus stramineus, Rv.*



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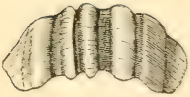

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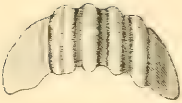

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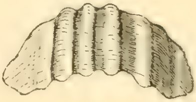

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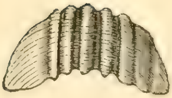

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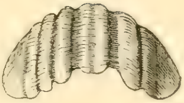

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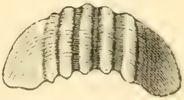

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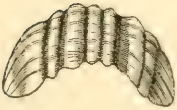

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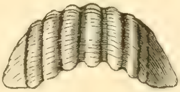

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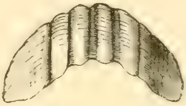

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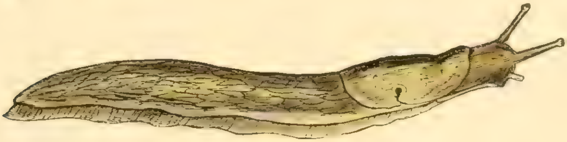

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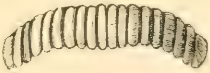

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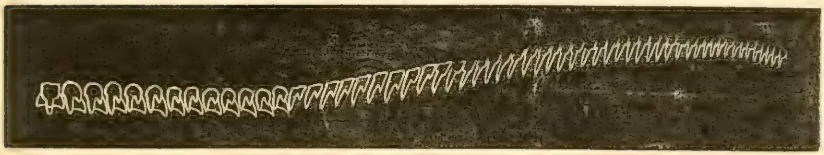
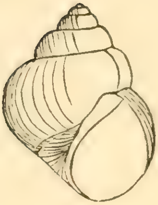


13.

Fig. 1. *Helix tryoni, Newcomb.*
" 2—10. *Jaws of Helix tryoni, Newcomb.*
" 11. *Ariolimax Columbianus.*
" 12. *Jaw of A. Columbianus.*
" 13. *Lingual dentition of A. Columbianus.*



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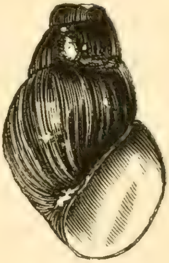

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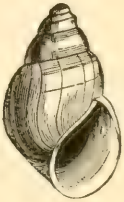

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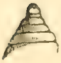

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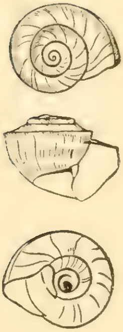

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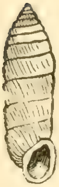

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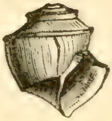

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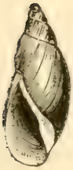
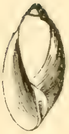
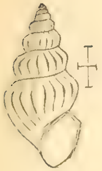




8.

Fig. 1. *Vivipara inornata, Binney.*
" 2. *Melantho decampi, Currier.*
" 3. *Ibid, Young.*
" 4, 5. *Cylindrella Coahuilensis, Binney.*
" 6. *Carinifex Newberryi, Lea.*
" 7. " " *variety.*
" 8. *Bulinus berlandierianus, Binney.*
" 9. " *hypnorum, Linn.*



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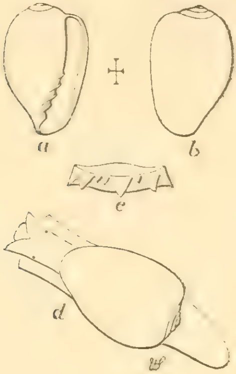

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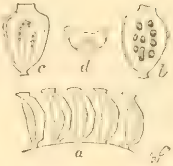

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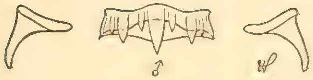

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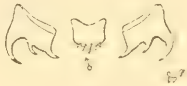

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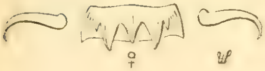

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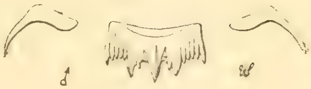

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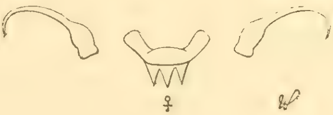
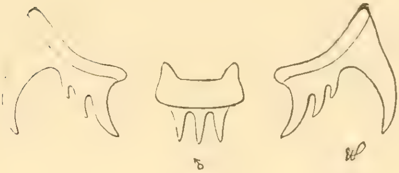


8.

Fig. 1. *Tryonia clathrata, Stimpson.*
" 2. *Cystiscus capensis,* "
" 3. *Trophon Gunneri. Lingual Teeth.*
" 4. *Tritonidia tincta.* " "
" 5. *Eupleura caudata.* " "
" 6. *Urosalpinx cinereus.* " "
" 7. " " *Ova-capsules.*
" 8. *Ptychatractus ligatus. Lingual Teeth.*



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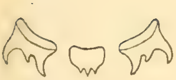

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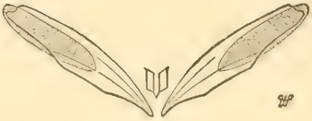

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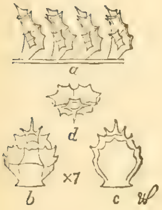

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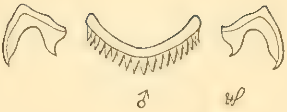

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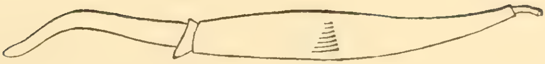
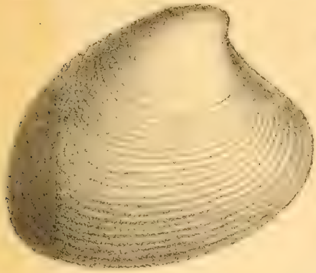


14.

Fig. 9. *Peristernia, Sp. Lingual Teeth.*
" 10. *Busycon pyrum.* " "
" 11. *Ilyanassa obsoleta.* " "
" 12. " " *Ova-capsules.*
" 13. *Clionella buccinoides. Lingual Teeth.*
" 14. *Helonyx clavatus.*



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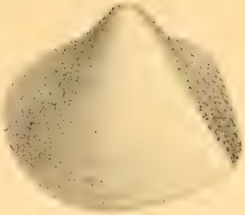

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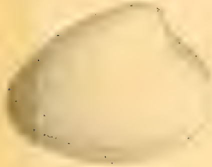

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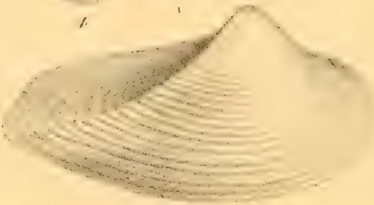

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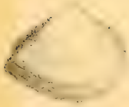

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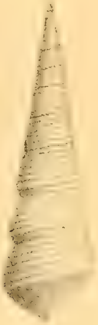

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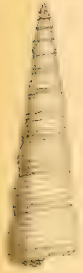

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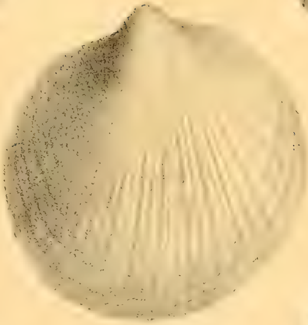

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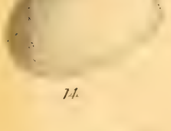

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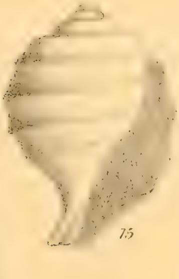

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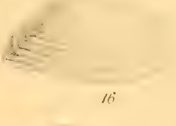

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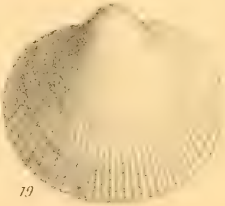
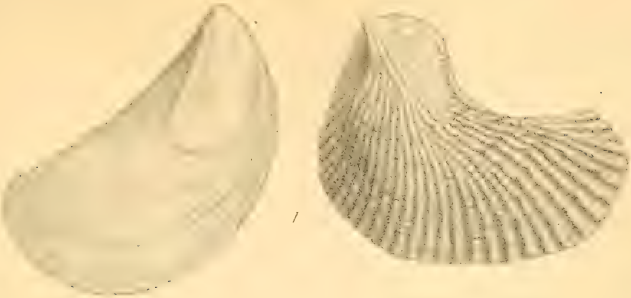


19

A CONRAD. DEL.

T. SINCLAIRS LITH PHILA

Plate 11.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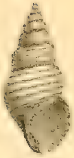
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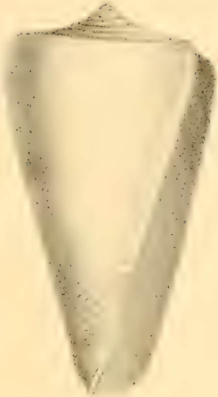
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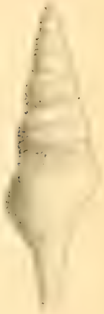
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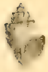
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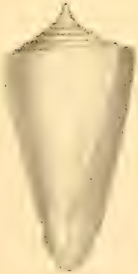
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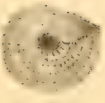
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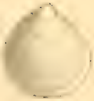
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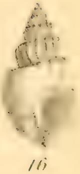
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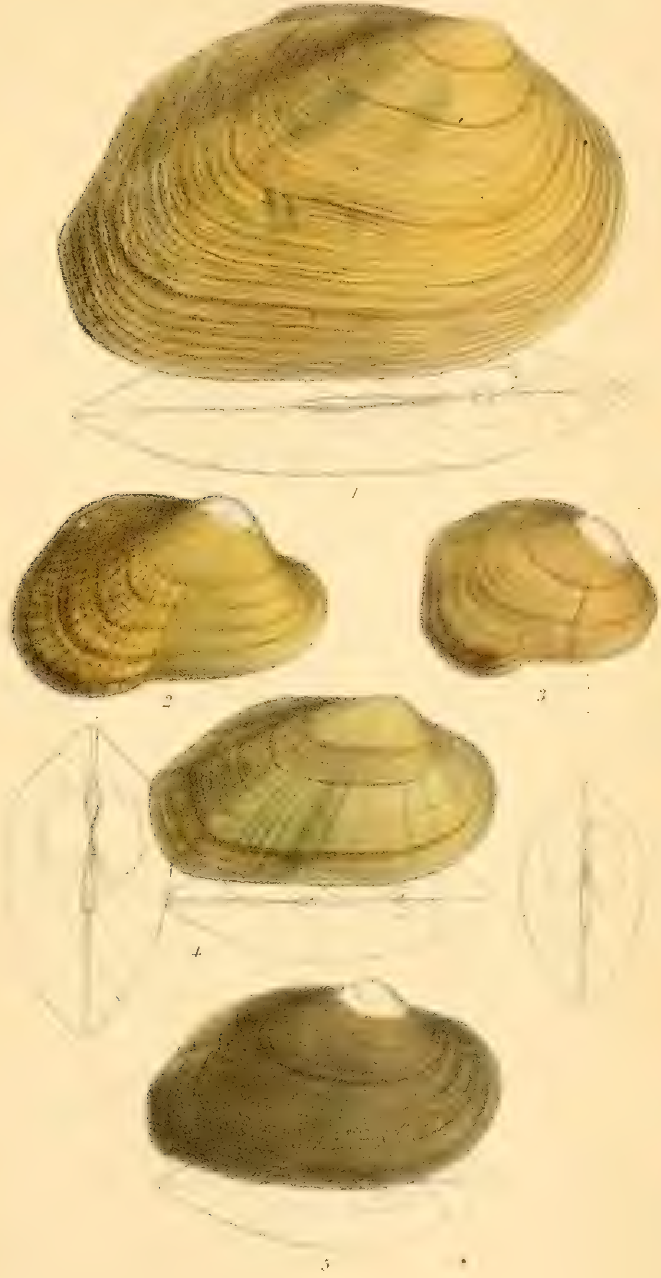
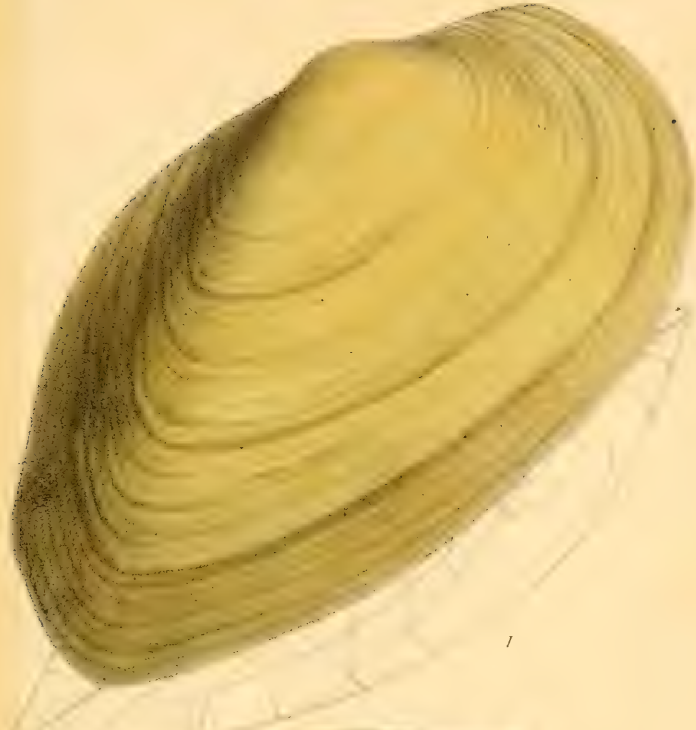


1. *Unio striatissimus.* Anth. 3. *Unio sacculus.* Anth.
2 „ *deviatus.* Anth. 4. *Alasmodon impressa.* Anth.
5. *Alasmodon rhombica.* Anth.

T. A. CONRAD. DEL. T. SINCLAIR'S LITH. PHILA



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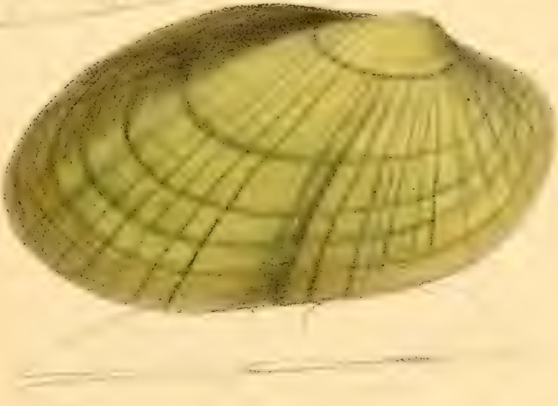

2

1. Anodon subangulata. Anth. 2. Unio distans. Anth

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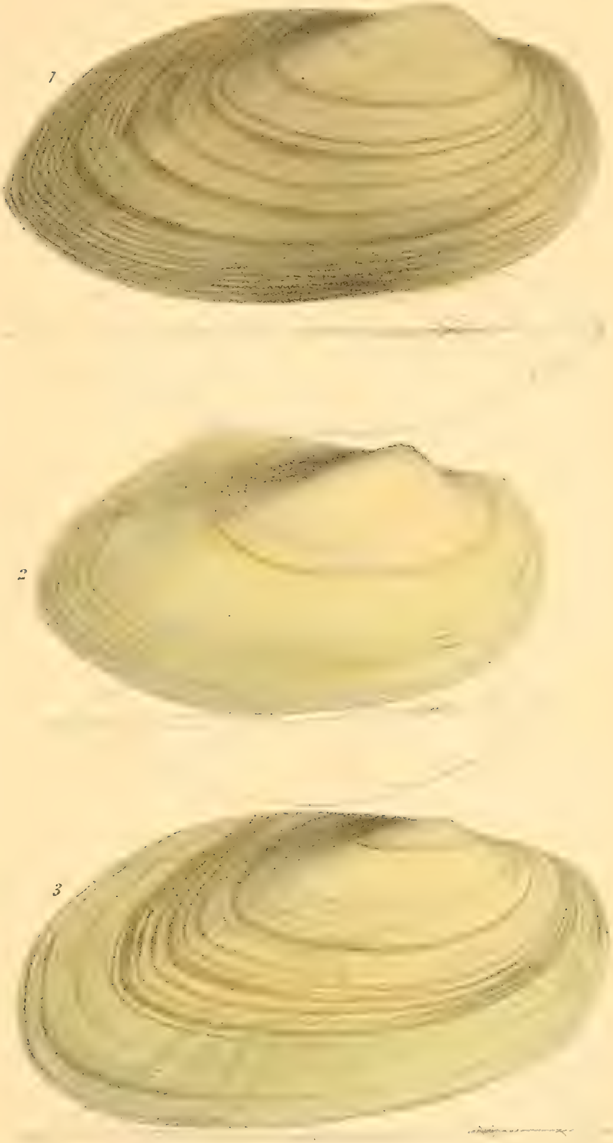
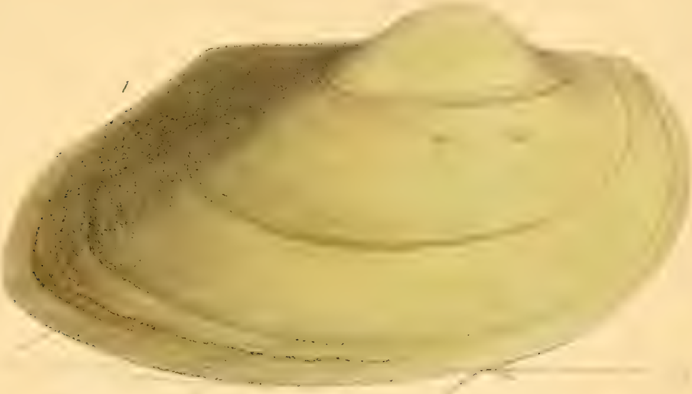


Sinclairs lith. Phil
T A Conrad. del.

Fig. 1. *Anodon imbricata, Anth.*
„ 2 „ *opalina,* „
„ 3 „ *flava,* „

1



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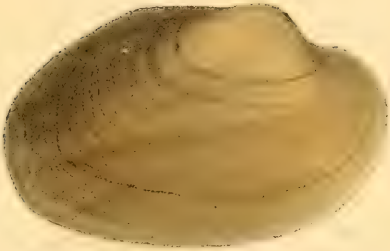

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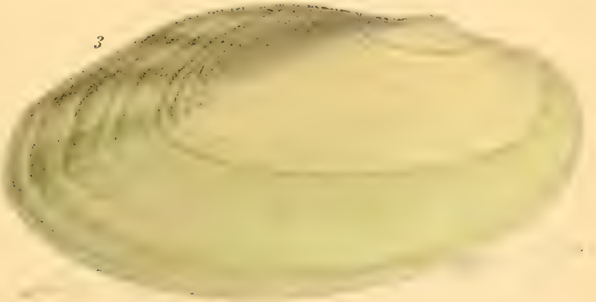

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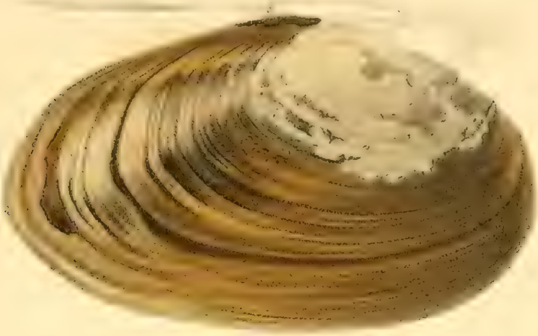
Fig. 1. Anodon subinflata, Anth.
„ 2. „ papyracea, „
„ 3. „ pallida, „



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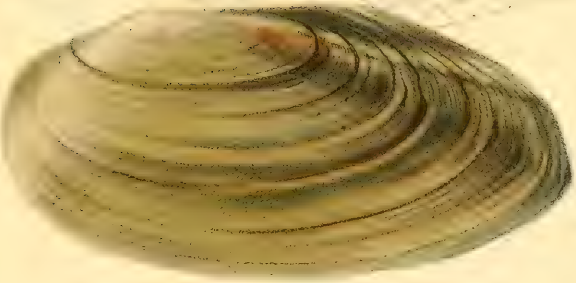

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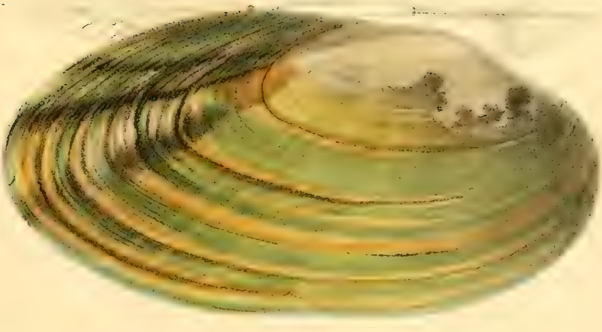

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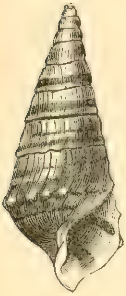
Fig.1.Anodon micans,Anth. 2.A. irisans,Anth. 3.A.glandulosa,Anth.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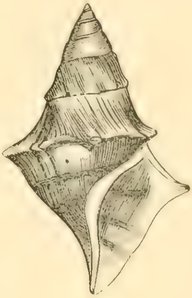
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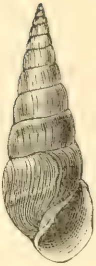
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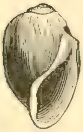
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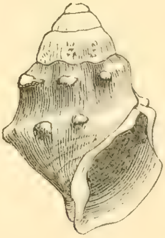
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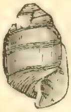
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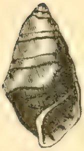
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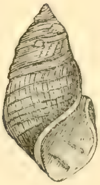
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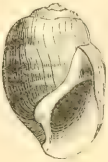
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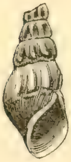
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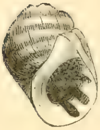
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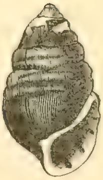
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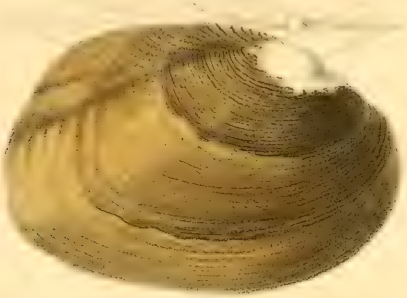
Fig. 1. *Io rhombica, Anth.*
" 2. *Pleurocera moniliferum, Lea.*
" 3. " *pallidum, Lea.*
" 4. *Angitrema Jayana, Lea.*
" 5. *Lithasia obovata, Say.*
" 6. *Strephobasis pumila, Lea.*

Fig. 7. *Eurycælon lachryma, Anth.*
" 8. " *crassa, Hald.*
" 9. *Goniobasis Thorntonii, Lea.*
" 10. " *calculoides, Lea.*
" 11. *Schizostoma Anthonyi, Reeve.*
" 12. *Anculosa tæniata, Conr.*



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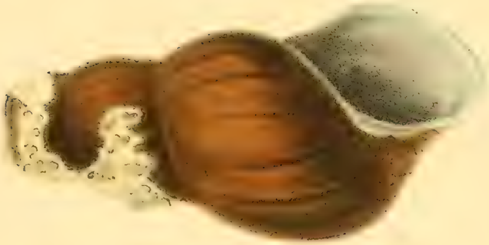

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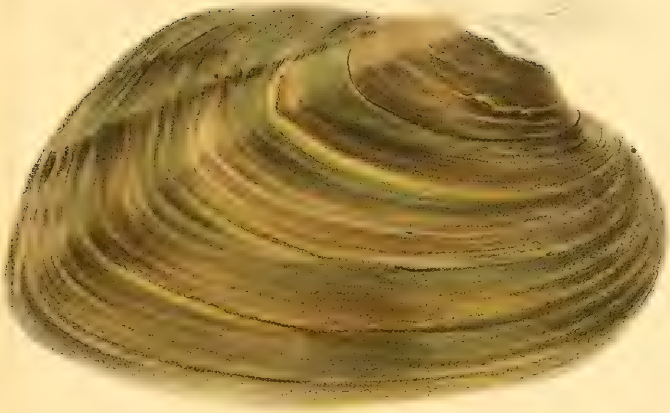

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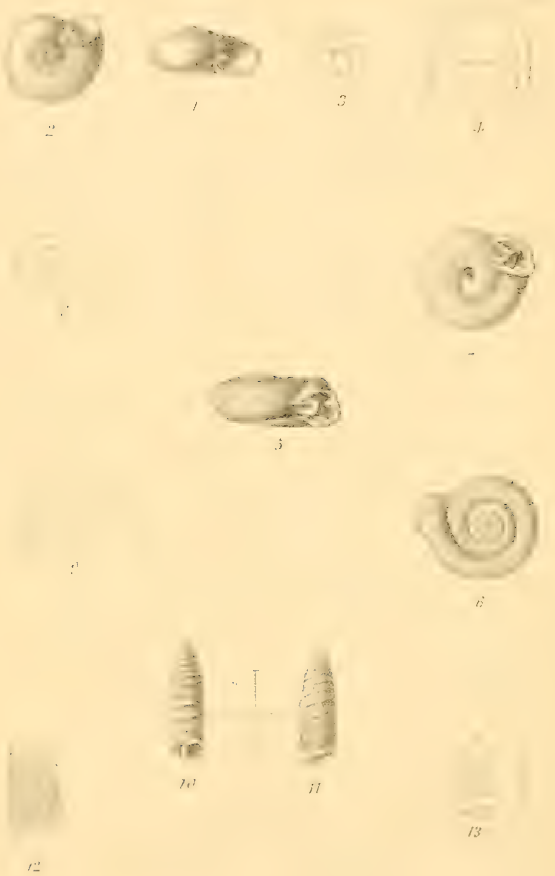
Fig. 1. Monocondylæa crebristriata, Anth. 2. M. Peguensis, Anth. 3. Melania gloriosa, Anth.



Figs. 1–4 Helix anilis, Gabb.
„ 5–9 „ Behrii, Gabb.
„ 10–13 Cylindrella Rémondi, Gabb.

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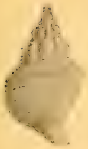

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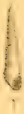

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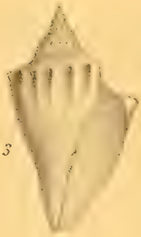

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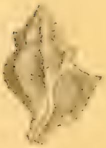

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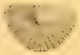

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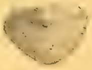

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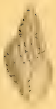

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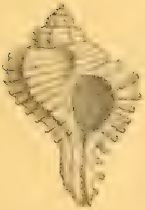

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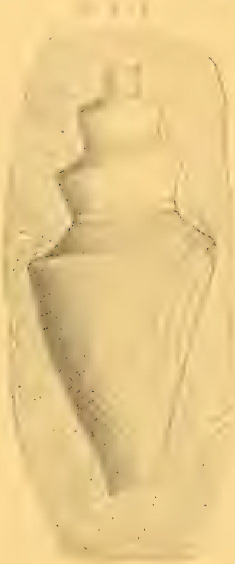

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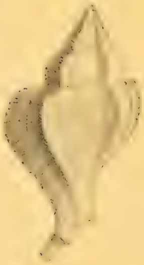

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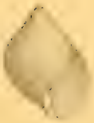

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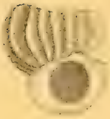

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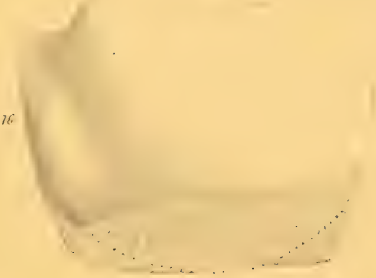

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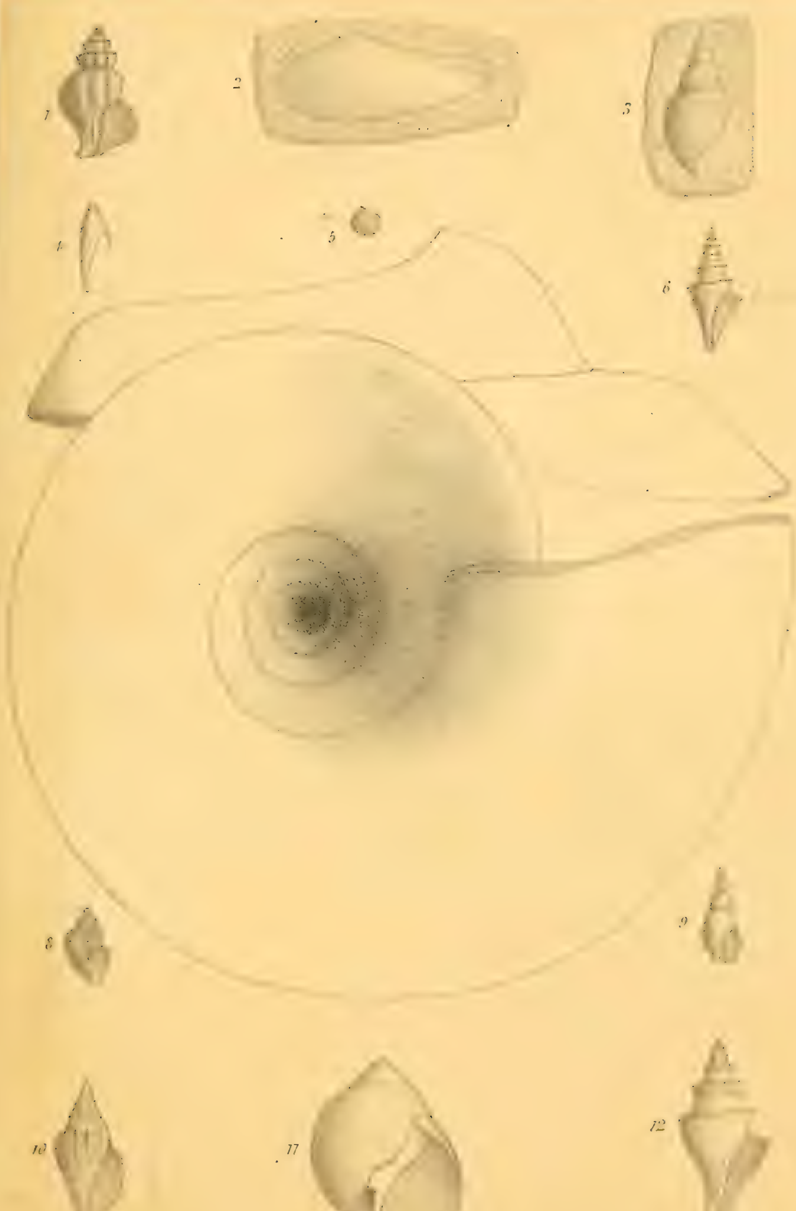
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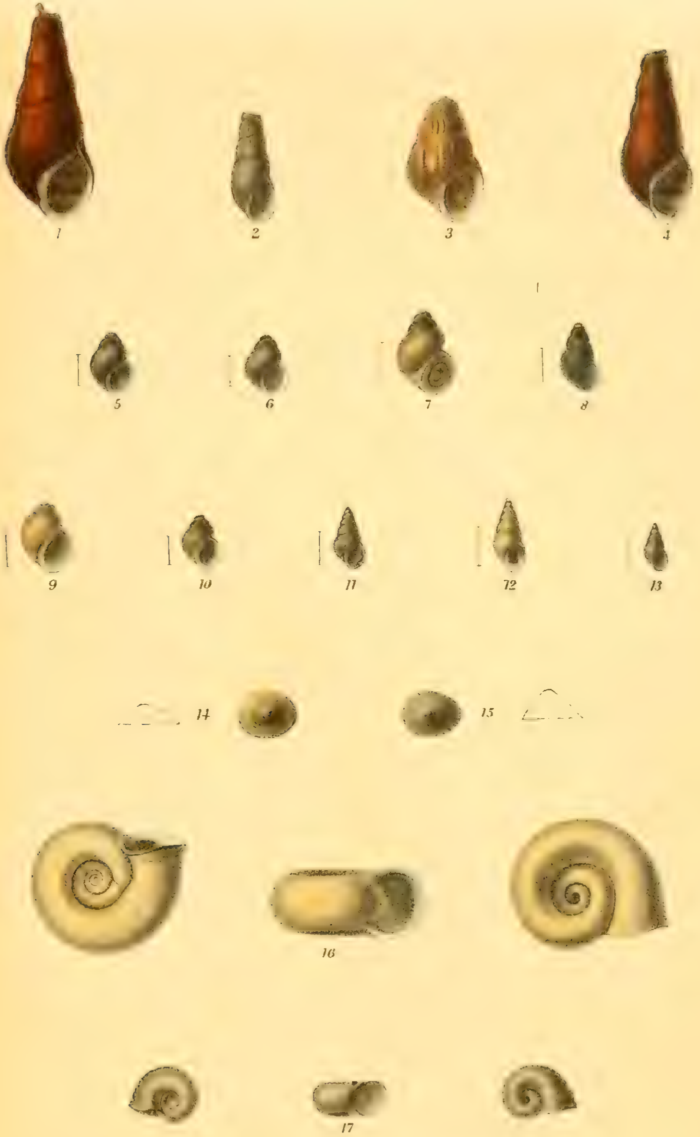

1. Melania brunnescens. Tryon.
2. „ unicolor. „
3. „ nillepunctata. „
4. „ retifera „
5. Amnicola turbiniformis „
6. Amnicola similis. Tryon
7. Gabbia australis. „
8. Pomatiopsis intermedia. „
9. Somatogyrus aureus. „
10. „ parvulus. „
11. Hydrobia californica. Tryon.
12. „ glabra „
13. Rissoa Cooperi. „
14. Ancylus subrotundatus „
15. „ altus. „
16. Planorbis Hornii. Tryon. 17. Planorbis oregonensis. Tryon.

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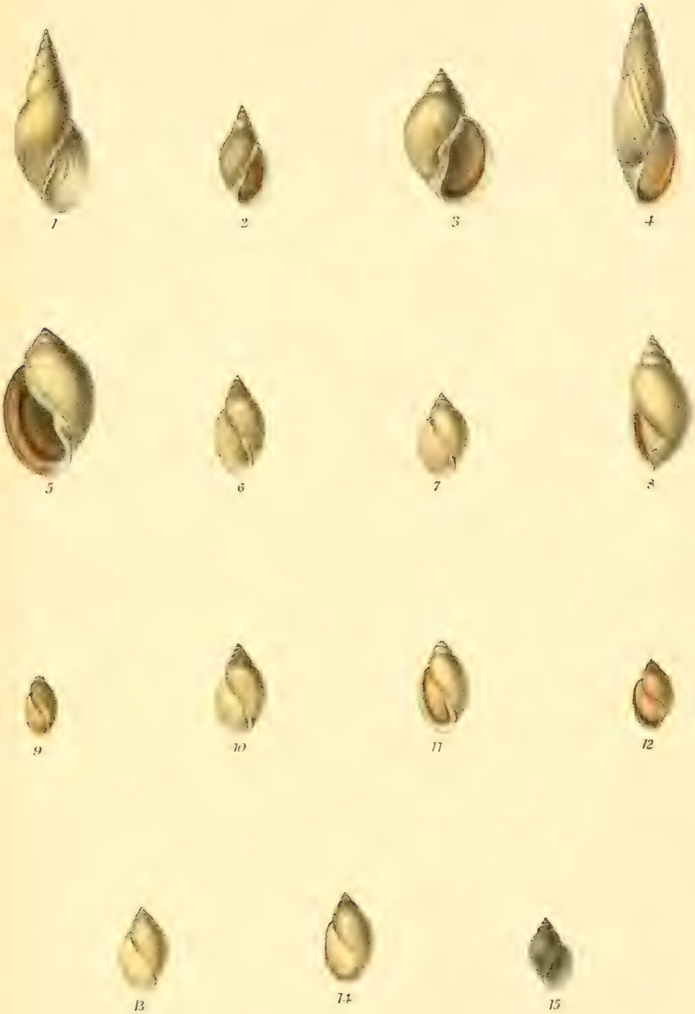
BOWEN & CO. LITH. PHILADA.



1. Limnaea Rowellii. Tryon.
2. „ Gabbii. „
3. „ Binneyi. „
4. „ zebra. „
5. Physa propinqua. „
6. Physa distinguenda. Tryon
7. „ lata. „
8. „ occidentalis. „
9. „ Cooperi. „
10. „ sparsestriata. „
11. Physa diaphana. Tryon.
12. „ Primeana. „
13. „ politissima. „
14. „ malleata. „
15. Limnaea Brownii „

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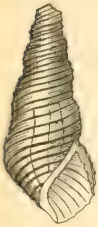
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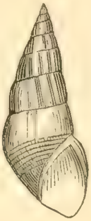
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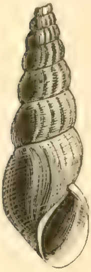
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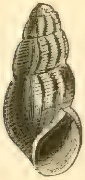
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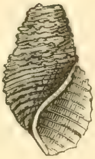
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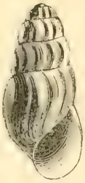
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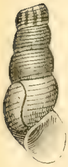
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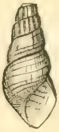
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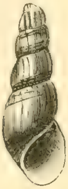
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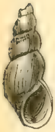
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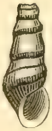
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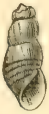
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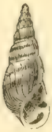
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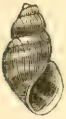
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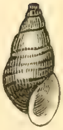
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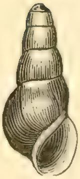
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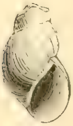
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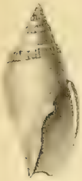
GONIOBASIS.

Figs. 1-2, *G. occata, Hinds.*
" 3, " *plicifera, Lea.*
" 4, " " *var. Oregonensis.*
" 5-6, " " " *bulimoides.*
" 7, " *rudens, Reeve.*
" 8, " *silicula, Gould.*
" 9, " *Shastaensis, Lea.*

Fig. 10, *G. Bairdiana, Lea.*
" 11, " *Draytonii, Lea.*
" 12, " *nigrina, Lea.*
" 13, " *rubiginosa, Lea.*
" 14-15, " *circumlineata, Tryon.*
" 16, " *Newberryi, Lea.*
" 17, " *bulbosa, Gould.*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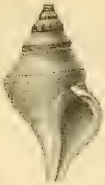
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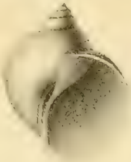
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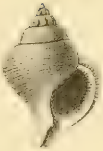
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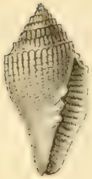
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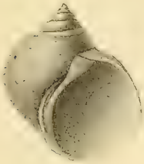
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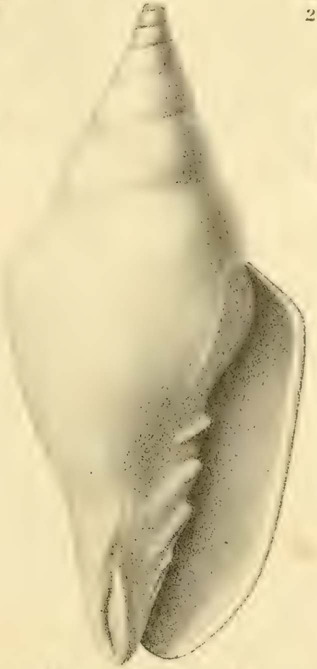
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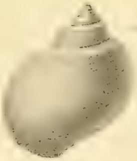
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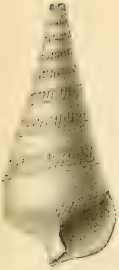
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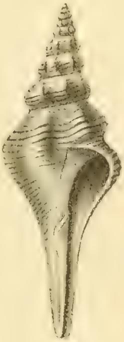
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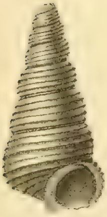
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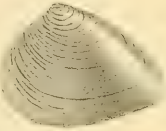
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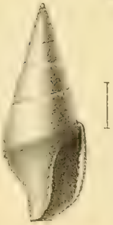
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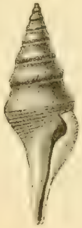
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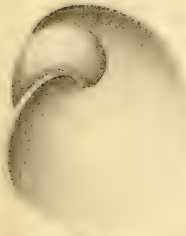
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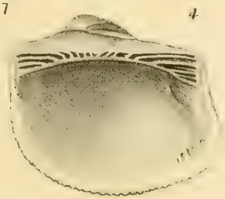
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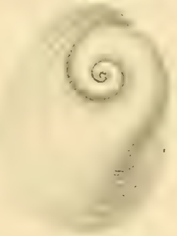
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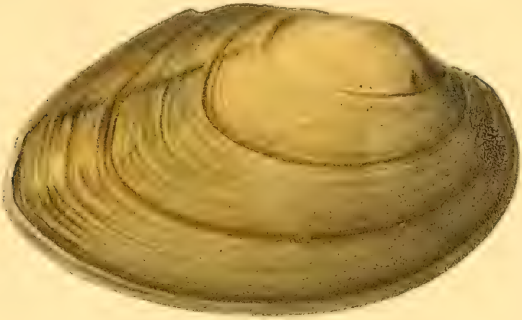
R.P. WHITFIELD DEL.

A.J. IBBOTSON LITH.



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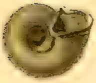

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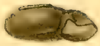

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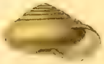

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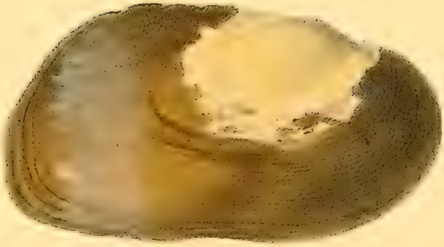
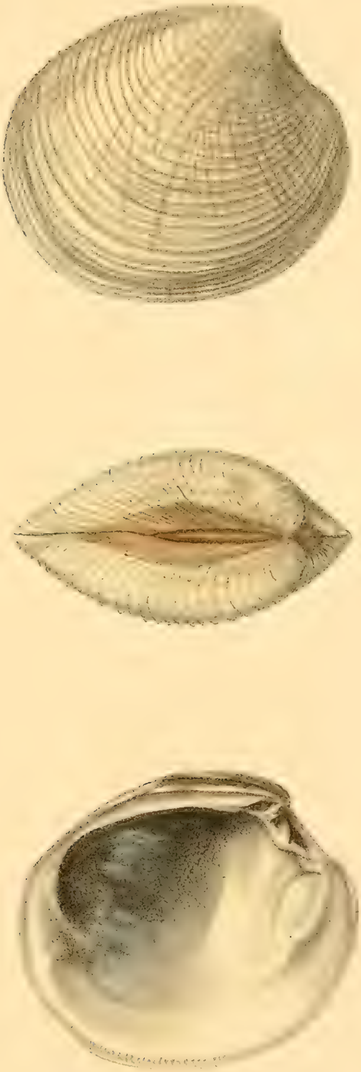


2.

Fig. 1. Pseudodon elliptica, Conrad. *Fig. 3. Helix cerinoidea, Anthony.*

„ 2. Unio Peguensis, Anthony. *„ 4. „ Voyana, Newcomb.*

Bowen & Co. Lith. Philada.



Mercenaria fulgurans, Tryon

J. GOLZ, DEL.

T. SINCLAIR'S LITH. PHILA

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